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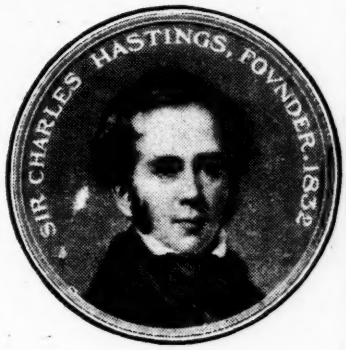

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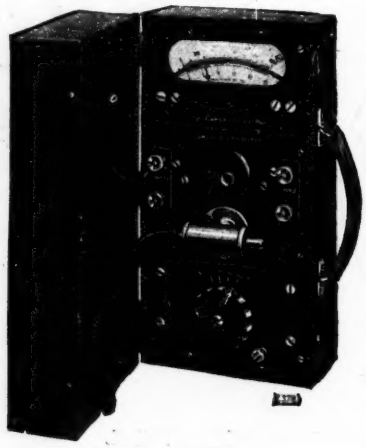

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PROCEEDINGS OF SECTIONS.

SECTION OF MEDICAL SOCIOLOGY.
E. ROWLAND FOTHERGILL, M.B., B.S., President.

THE PRESIDENT, in opening the proceedings of the Section, said that some twelve years ago the British Medical Association decided that amongst the other Sections at the Annual Meeting it should include one—the Section of Medical Sociology—to which the laity might be invited to contribute to discussions. The question of alcohol had been chosen on the present occasion, but it was obviously a subject on which the limits of discussion must be strictly defined. The question was:

> "To what extent, if any, can alcohol as a beverage be considered to have any influence on the human economy, mental disorders, industrial efficiency, and infant mortality?"

DISCUSSION ON ALCOHOL AS A BEVERAGE AND ITS RELATION TO CERTAIN SOCIAL PROBLEMS.

THE ACTION OF ALCOHOL ON THE HUMAN ECONOMY.

BY

EDWARD MELLANBY, M.A., M.D.Cantab.,
Professor of Pharmacology, University of Sheffield.

THE advantages of alcohol as a beverage are so obvious to some and its disadvantages so thoroughly realized by others that, until recent years, scientific discussions of an impartial nature of problems centring round it were rare. It seemed to the average man to be a subject which required no special knowledge in order that he should either strongly favour it as a great blessing to mankind or denounce it as the greatest curse. Fortunately the point of view is gradually altering, and, while we realize that the problems presented by alcohol in its relation to human existence are of the most pressing importance, we also believe that a true judgement can only be arrived at by a careful consideration of the facts.

As a preliminary to the more interesting papers and contributions to the discussion of the social problems which we are to hear to-day, and as affording a foundation for such discussion, it is my duty to describe some of the fundamental facts as to the action of alcohol on the human economy and to supply a summary of the views generally held by those who have made a close study of the pharmacology and therapeutics of alcohol.

Alcohol may be considered from various aspects—for instance, as a beverage imbibed extensively by healthy people, or as a medicine taken in sickness. It must be admitted that, whatever the point of view, our knowledge of the subject is still meagre. We have some knowledge of its action in health, but we cannot be certain that the known facts are always sufficient to explain its action in disease. It is probable that many of the effects produced by alcohol in health and disease can be similarly explained, and that the basis of its action in both cases is generally the same, but this does not mean that it is always the same. Some such warning seems necessary at the beginning of this discussion, for there is still much difference of opinion among those well qualified to judge as to the action of alcohol in various diseases, and it is probable that these differences do not depend on prejudice but on our limited knowledge. This point will be referred to again after the action of alcohol on the nervous system has been discussed and when its therapeutic properties are being considered.

It will be well at the outset to distinguish carefully between two properties, of a diverse and apparently independent nature, possessed by alcohol, both of which will be encountered in any discussion on the subject, either from a medical or sociological point of view. In the first place, if a food be defined as that which can supply useful energy to the body, then alcohol is a food. Secondly, in that alcohol has the property of modifying the function of living matter, it must be regarded as a drug. Alcohol is, in fact, to be classified as a food-drug. I shall consider these two properties of alcohol separately, taking the drug action first.

By far the most important action of alcohol as a drug depends upon its power to modify the functions of the nervous system. The special affinity of alcohol for this system is thought to be due to its high lipoid content, thus allowing the easier access of alcohol into the nerve cells. The fact that in discussing the action of alcohol attention is usually fixed on its power to modify the functions of the nervous system is no doubt due to the ease with which such modification of function can be detected. The activities of other organs are also altered by alcohol, but such changes are usually more difficult to detect, and only appear to be of sufficient interest to merit attention in acute and chronic alcoholic poisoning, or when the structure of the organ shows pathological changes. Alcohol is a popular beverage because of its property of inducing changes in the nervous system which are the basis of the altered sensations and outlook sometimes described as euphoria. Many investigations and much discussion have centred round this action. The effects are apparently very contradictory; whereas drowsiness is often produced even by the smallest doses, at other times excitement is more evident, and even in the same person periods of drowsiness and excitement may alternate according as the environment changes. There is but little wonder that two schools of thought have arisen among those studying the problem, one regarding alcohol as primarily a stimulant to the nervous system, and the other, led by Schmiedeberg, as a depressant in action from the first. This discussion might have been interminable had it not been that in recent times our knowledge of the functions and mode of action of the nervous system has developed to an extent which allows us to get a better understanding of the symptoms produced by alcohol, and to place in alignment facts which formerly seemed so contradictory. We know now that the outstanding function of the cerebral cortex is to restrain and inhibit many of the activities of the lower and earlier developed parts of the nervous system. It allows us to judge and to discriminate, and, by directly influencing the thalamus, controls our emotions. It is the great brake, both as regards activities associated with conscious effort and in those more automatic. It exerts a constant influence on the paracerebellar nuclei, thereby antagonizing overaction of the cerebellum, and, by bringing to bear a steadying effect on the spinal cord, it prevents spastic and inco-ordinate movement. Thus it is obvious that any narcotic whose primary action is to paralyse this part of the nervous system will produce just those symptoms which are seen in alcoholic intoxication. As the direct result of narcotizing the cells of the cerebral cortex we can easily understand the loss of judgement, memory, power of association, and the increased tendency to sleep. Similarly, the impairment by alcohol of delicate actions associated with concentration and mental effort—such, for instance, as setting up type and shooting at a target—can be explained along these lines. It is most noteworthy that the above-described effects of alcohol are produced by small doses, say 1 oz., when no one would suggest intoxication, or even suspect, from the general demeanour of the person tested, that alcohol had been drunk. In fact, in order to detect these changes produced by small quantities of alcohol, accurate scientific experiments must generally be made.

But in addition to these fairly self-evident facts we can now understand some of the nervous effects of alcohol on the emotional side, since we know from Head's work that the thalamus is particularly related to the emotions. Small quantities of alcohol by depressing the higher centres release the brake on the thalamus and so allow freer play to the emotions. Feelings of joy, misery, anger, and excitement are more easily called forth, and with cares and worries forgotten a feeling of light-heartedness usually develops. Self-consciousness and self-criticism are depressed by alcohol, and for this reason alcohol may make apparently ordinary people talk in a clever and interesting way and shy people bolder. All the latter results, which at one time were regarded as evidence of a stimulating action of alcohol, are now generally regarded as being the result of depression and partial paralysis of a normal inhibitory mechanism.

It is interesting to note that, unlike morphine, which picks out and depresses primarily that part of the brain which appreciates sensation, alcohol does not seem to have any selective effect in acting on the cerebral cortex. Whereas a

man is cut off to a great extent from his environment by morphine, so that his thoughts are largely concerned with past experiences, alcohol in moderate quantities has no such effect on the sensorium, and under its influence a man's thoughts centre round and are easily affected by his immediate surroundings.

With larger doses of alcohol the action on the nervous system is more obviously depressant—greater inco-ordination of movement, more or less anaesthesia, depression of reflexes and of the respiratory and other centres all appearing and becoming more strongly developed.

It is clear that alcohol must be placed among the narcotic drugs so far as its action on the normal human organism is concerned. To class alcohol as a narcotic may seem to some people to put it out of court as a substance capable of usefulness either as a beverage or as a therapeutic agent. This seems to me to be a wrong view, for narcotics have their sphere of usefulness just as certainly as have stimulants. Modern conditions of life, with its competition, acquisitiveness, and restlessness, have many undesirable features which make existence almost intolerable to many people. Alcohol is taken as a beverage by the average man in order to escape, at least for a time, from the strain of existence. Small quantities of alcohol are capable of dispersing temporarily many of the worries and troubles of life, and so may play a part in restoring to better working order various functions of the body whose action is known to be depressed by anxiety. For instance, nothing is more certain than that worry has a depressing influence both on the secretion and movement of the stomach, and thereby may induce or exaggerate a dyspeptic condition. Some cases of dyspepsia of this type may be favourably influenced by dilute alcoholic beverages, which obliterate the worry and so remove the factor responsible for the reduced secretion of gastric juice and the sluggishness of movement of the stomach walls.

Dale has recently suggested that the narcotic action of alcohol on the nervous system probably accounts for the instances where it is regarded as having a beneficial effect in disease, and where such an influence cannot readily be explained along lines compatible with its recognized pharmacological action. He argues that in sick people the functions may be depressed not only by actual weakness but by inhibition due to reflex action or to influences from the higher centres. For instance, in syncope due to fright or pain the heart and vasomotor centre are undoubtedly subjected to severe central inhibition, and alcohol may have a beneficial effect in these conditions because it weakens and removes this inhibition by its narcotic action. From the point of view of experimental pharmacology it has been difficult to understand some of the actions of alcohol described by clinicians in heart failure associated with pneumonia, typhoid, and other diseases. On the one hand, evidence of a direct stimulant effect of alcohol on the heart is not satisfactory, while, on the other hand, the beneficial effect of alcohol in some cases of heart failure is too widely accepted to be passed over lightly. The suggestion that the beneficial effect in these cases may depend on the power of alcohol to depress excessive inhibitions is worthy of further consideration. Dale has also pointed out that if rapid, shallow breathing produces anoxaemia and the baneful effects as stated by Haldane, then alcohol, by slowing the respirations and making them deeper, may be beneficial in diseases where this type of breathing occurs.

To sum up, although alcohol can no longer be regarded as a stimulant except in so far as it irritates the nerve-endings of such organs as the mouth, oesophagus, and stomach, its effects, whether as a beverage or as a medicine, may be no less important, even though they are to be explained by its narcotic action on the central nervous system.

ALCOHOL AS A FOOD.

I shall now deal with alcohol as a substance capable of supplying useful energy to the body. It was shown by Atwater and Benedict, that nearly all alcohol, when drunk in moderate quantities, is completely oxidized in the body, and that only quantities of the order of 2 per cent. escape unchanged in the urine and expired air. Since the oxidation of 1 gram of alcohol gives rise to 7 calories of heat, as compared with 4.1 calories produced when either 1 gram of protein or 1 gram of carbohydrate is oxidized, it is evident that, if we can overcome the toxic effects of alcohol, the amount of energy it can supply to the body ought to be large. Alcohol has a further advantage in that it requires no digestion and is rapidly absorbed from the stomach and alimentary canal.

Two questions that require an answer are: (1) How much energy can alcohol supply to the body? (2) What is the best way to give alcohol in order to obtain the maximum amount of energy with the minimum of toxic action?

As regards the first question, some idea of the energy supplied by alcohol oxidation has been obtained by Völtz and Dietrich, who showed that in resting dogs 42 per cent. of the total energy was supplied by alcohol in a ten hours' experiment, and 35 per cent. in a fifteen hours' experiment. In one of my own experiments a dog weighing 13.5 kg. was given 50 c.cm. of alcohol in a 20 per cent. solution. This was oxidized in twenty hours, as shown by the fact that after this time the blood was alcohol-free—that is to say, 2.5 c.cm. of alcohol were oxidized each hour, thus supplying to the dog 1.04 calories of heat per kilogram body-weight per hour. This represents about 40 per cent. of the total heat lost during the period. A similar experiment on a man may be described. He drank in half an hour whisky containing 171 c.cm. of absolute alcohol (he could have drunk this quantity easily in five minutes). His weight was 70 kg. The amount of alcohol in his blood was estimated at intervals, and from the curve obtained the rate of oxidation of alcohol in his body was calculated. It was found that he oxidized about 10 c.cm. of alcohol an hour, and was thus supplied with 54 calories an hour, or, roughly, at the rate of 1,300 calories per diem. This would represent about 40 per cent. of his total heat loss.

In the above-described experiments on the dog and man, although a surprisingly large amount of energy was supplied to the organism by alcoholic oxidation, from the point of view of medicine the results are of but little interest, for intoxication of a severe degree was produced in both cases. Later I shall describe how the toxic symptoms can be eliminated and yet the body be supplied with a large amount of energy from alcohol.

I have shown in a previous publication that the rate of oxidation of alcohol in the body is independent of the amount present in the blood over fairly wide limits. The rate of disappearance of alcohol from the blood is almost the same in dogs, whether a large dose sufficient to produce profound intoxication (say 50 c.cm. of alcohol) or a much smaller dose (say 20 c.cm.) is given. This fact had previously been demonstrated by Higgins, using another method, for he found the respiratory quotient of men to be depressed to the same degree by 30 c.cm. and by 45 c.cm. of alcohol. Carbohydrates and fats do not act as foodstuffs in this way, for their influence on the respiratory quotient varies with the amount eaten. This difference between alcohol and other foodstuffs is important both from a scientific and a practical point of view.

As mentioned above, the man of 70 kg. weight when at rest oxidized 10 c.cm. of alcohol an hour, so that if the constant rate of oxidation holds also for very low concentrations, it would only be necessary to give doses of about 10 c.cm. an hour in order that the maximum amount of energy in unit time be obtained from the oxidation of this substance. The smaller the dose the less toxic the action, so it may be possible to get out of alcohol the maximum amount of energy in unit time and escape the effects due to its drug action. Experiments have proved this to be the case.

It is now well recognized that the food properties of alcohol can be made use of to the best purpose in diabetes mellitus. In the modern treatment of this disease the diet is so arranged that the urine is kept sugar-free, but in severe cases this generally means that the diet is extraordinarily small from the point of view of energy. When any attempt is made in such cases to increase the amount of food, sugar excretion usually commences. Alcohol can be oxidized by these diabetics without causing the production of sugar, and so is a useful adjunct to the dietary for supplying energy.

Southgate and I have recently investigated the best way to supply alcohol to diabetics of this type, and have found the amount of energy that can be provided without production of toxic action. The details of this work will be published elsewhere. We corroborated and made use of the fact discussed above and suggested by the animal experiments, that, even when small quantities of alcohol are drunk, the rate of oxidation is not greatly reduced. We found the amount of alcohol the diabetic patient could oxidize each hour, and then gave this quantity hourly throughout the day. The amount varies with the weight of the patient, and whether he be confined to bed or living an active life. The alcohol burnt up by the average diabetic is of the order of 7 to 10 c.cm. an hour. By this method of administration no symptoms of alcoholism are produced, for the alcohol in the blood and

nervous system is never more than a trace at any time of the day. If the amount is increased beyond that oxidized there will be a slight accumulation of alcohol in the body and the patient may become drowsy and sometimes flushed late in the day, but this can be avoided by reducing the amount. Thus, allowing the patient eight hours' sleep, a small dose of 7 c.cm. of alcohol or thereabouts can be given each hour for sixteen hours, in which case 112 c.cm. of alcohol are oxidized, supplying 630 calories of heat. This is a minimum, and in practice larger quantities of energy can be obtained from alcohol in specific cases. The energy supplied in this way without producing toxic symptoms or increasing the sugar in the blood makes all the difference to the treatment of severe cases of diabetes, and allows the patients to live a more active life and at the same time retain their weight.

It is most important in giving alcohol for therapeutic purposes, especially if drunk repeatedly and over any length of time, to dilute it well. In some cases, no doubt, the therapeutic effect most desired in prescribing alcohol is its irritant action on the mucous membrane of the mouth, oesophagus, and stomach. But it is usually necessary to eliminate this irritant effect, and in this connexion it may be stated that alcohol in concentration of 10 per cent. or over will produce gastritis if taken repeatedly, especially on an empty stomach. In diabetes, for instance, it ought to be diluted to 5 or 6 per cent. strength. Even where the drug action of alcohol is required for therapeutic purposes, except when it is specifically given as an irritant, it is best given in a dilute form; dilution of quantities up to 30 c.cm. makes but little difference to the intensity of its action. Vernon tested the relative effects of drinking 30 c.cm. of alcohol in 40, 20, and 5 per cent. solutions on the efficiency of typing memorized passages, and found that the 5 per cent. solution resulted in three-quarters of the increase in errors produced by the 20 and 40 per cent. solutions. Therefore, by diluting therapeutic doses of alcohol, its effect as regards the irritation of the stomach is lost, but its action after absorption is not greatly affected. It will be seen later that dilution becomes of still greater importance when larger quantities of alcohol are imbibed.

The foregoing facts as to the food value of alcohol throw some light on the condition of corpulency so commonly found among chronic alcoholics. While there is no evidence that alcohol itself is converted into fat, we have seen that it replaces and conserves fat already present in the body. In the case of malt beverages the constituents other than alcohol are an additional source of energy and their carbohydrate quota is readily converted into fat. Another factor of importance in this connexion is that alcohol diminishes activity by its narcotic action on the nervous system, and for this reason also encourages the accumulation of fat.

To sum up, alcohol can supply a large amount of energy to the body both in health and disease. This can be made use of especially in diabetes mellitus. In giving alcohol as a food in disease it is important to reduce to a minimum its drug action. This can best be done by (1) giving small doses frequently—for instance, hourly doses of 7 to 10 c.cm. that can be oxidized in this time, and (2) by diluting it down to about 5 per cent. strength.

Alcohol in Starvation and Exposure.

Considering the amount of energy that can be supplied to the body by alcohol, it might be thought that in the treatment of starvation and exposure this substance would have great merits. This idea is increased by the knowledge that alcohol in these conditions brings a sense of comfort such as no other drug can bring. The skin vessels are dilated by the alcohol, a sense of warmth pervades the body, and, in addition, anxiety and worry are forgotten. There is but little wonder that in these conditions alcohol is often regarded as a panacea. In some cases this is true, but in others the giving of alcohol is bad practice. We must see what the closer study of alcohol teaches in this matter.

While it is true that alcohol can supply a large proportion of energy to the body, it is different from other foodstuffs in that it has no stimulating effect on the metabolism. In other words, alcohol has no specific dynamic action, while, according to Rubner, the specific dynamic action of meat protein is 44, of fat 16, and of carbohydrate 10. Suppose, for instance, a man is starving and alcohol alone be given him, his production of heat will not increase. If he is given carbohydrates his production of heat will increase slightly. If given protein, the metabolism will be greatly stimulated. Although alcohol supplies heat as the result of its combustion, it does not make any more energy immediately available for the body; while protein, which gives less heat on combustion, stimulates the metabolism and affords an immediate increase in available energy. Alcohol conserves the stores of protein, fat, and carbohydrate. In the case of the starving man to whom alcohol is administered its first effect is to dilate the cutaneous blood vessels, thereby allowing a rush of blood through the skin. This affords a feeling of warmth and well-being but, by increasing the temperature of the skin, increases the heat loss. Since alcohol does not increase the metabolism, if no other food be available it is clear that the temperature of the body must fall, for the increased heat loss is not counterbalanced by increased heat production. If the alcohol also induces drowsiness and exerts its narcotic action on the neuro-muscular mechanism, the heat production may be still further reduced, with a corresponding increase in fall of temperature, and death may ensue. We see, therefore, that in cases of hardship and exposure, alcohol ought never to be given or taken unless there is an immediate possibility of obtaining more food and shelter. Where additional food and warmth are attainable, alcohol as a means of producing an immediate sense of comfort may be justifiable since the above reasons against its administration are no longer present.

Alcohol and Heredity.

I wish now to refer briefly to the work of Stockard, whereby facts of apparently fundamental importance as regards the relation of alcohol to certain problems of heredity have been brought to light. There has long been in the minds of people the idea that toxic substances such as alcohol and the virus of syphilis may injure germ cells in such a way that the progeny, not only of the exposed parents but also of the unexposed succeeding generations, are abnormal. Stockard's investigations appear to lend strong support to these views and to supply a means for working out the subject by a scientific method. By placing male guinea-pigs in air containing alcohol vapour for periods of one hour each day—that is to say, until they are completely intoxicated—for six days in the week, and then crossing them with untreated normal females, Stockard was able to show that the progeny are often aborted, and that of those surviving there is a high percentage of abnormalities, including (1) absence of eyes, (2) defect and sometimes absence of brains, (3) nervous symptoms of the nature of paralysis agitans. These abnormalities, which must be the result of damage to the male germ cell, may be transmitted through several generations, although none of the succeeding parents are again exposed to the alcohol vapour. The damage to the germ cell is, in fact, transmitted to the offspring, and only slowly returns to the normal through succeeding generations.

The treatment of the male guinea-pigs was very severe, and an analogous state could only be found in human beings in very exceptional cases. Before these results are accepted as being directly applicable to man further careful inquiry and investigation must be made. But to have put a problem of this type on to an experimental basis seems to me to be an achievement of great value.

Alcohol and Drunkenness.

So far I have dealt with the effects produced by amounts of alcohol that could reasonably be given for therapeutic purposes, and I shall now deal with drunkenness, and briefly discuss some of the conditions which influence the development of this condition. Undoubtedly the same factors also influence the slighter effects of alcohol, but they become more prominent, and are more easily studied, in connexion with pronounced degrees of intoxication.

1. *Size.*

It takes more than the proportionate amount of alcohol to raise the alcohol concentration in the blood to a definite point in the case of a large animal, and especially a large fat animal, as compared with a small animal. If this result applies to man, as it probably does, then supposing there were two men, A and B, of weight 7 st. and 15 st. respectively, all other conditions being equal, it would be necessary to give B more than twice the amount of alcohol drunk by A to make them equally drunk. The corpulency and size of the chronic alcoholic is undoubtedly largely responsible for his apparent tolerance.

2. *Dilution of Alcohol.*

Whereas with small quantities of alcohol the rate of absorption into the blood stream and therefore the symptoms

of intoxication do not greatly differ whether it is drunk as a 5 per cent. or a 20 per cent. solution, with larger quantities such as will produce drunkenness the concentrated solution is absorbed more rapidly and reaches a higher maximum in the blood. Corresponding to this, the degree of intoxication produced by the strong solution is more intense. These differences in intoxication dependent upon concentration hold even when all the alcohol in each case is imbibed in the same time. In practice, however, another factor is introduced with dilution which is of greater importance in comparing the intoxication symptoms produced by weak and strong alcoholic solutions—namely, time of drinking. The volume of a concentrated alcoholic solution, such as whisky containing 20 per cent. alcohol, necessary to produce the most profound degree of intoxication can be drunk in a few moments, whereas to imbibe the same amount of alcohol in a dilute form such as beer may take hours of steady drinking. During these hours alcohol already absorbed is being oxidized, thereby preventing the alcohol concentration in the blood ever attaining the high maximum which is found in the case of the concentrated solution. The relative intoxicating power of concentrated and dilute alcoholic beverages—for example, whisky and beer—is very different when their action on man is compared, but the problem is not a simple one, and limitation of space prevents further discussion here. Diluting an alcoholic beverage already dilute—for instance, converting a 5 per cent. into a 3 per cent. beer—makes a very great difference in the intoxicating power for the same reasons. I have seen no evidence that there is any truth in the popular belief that mixed drinks have special intoxicating properties except in so far as more of each beverage may be drunk or the average concentration of alcohol increased.

3. *The Influence of Food.*

Food in the stomach and alimentary canal has a great influence on the absorption of alcohol into the blood stream, and therefore on the symptoms of alcoholic intoxication. Practically all foods have some effect in inhibiting the absorption, but milk stands in a pre-eminent position. Nor is it necessary that the milk be drunk with or immediately before the alcohol. Some inhibiting influence is seen even if taken as long as four hours beforehand. Experiments demonstrate that the most important inhibitory factor in milk is the fat. These results have been extended to and confirmed in man. The extent to which milk can modify or eliminate the worst symptoms of alcoholic intoxication is most striking. The popularity of a combination of rum and milk among north-country men is a clear indication that the empiricist has arrived at this fact before the scientist.

4. *Intervals between Drinks.*

If it is desired to reduce the symptoms of intoxication by introducing an interval between drinking periods instead of by diminishing the amount of alcohol drunk, then this interval ought to be long. The fact that the interval must be long depends on the slow rate of alcohol oxidation in the body as compared with the size of the intoxicating dose. After a good carouse it will take ten to eighteen hours for the alcohol to be cleared out of the circulation of a man. Its presence in the blood indicates the reason for the lack of appetite at breakfast on these occasions.

5. *Effect of Exercise.*

Muscular exertion increases the rate of oxidation of alcohol in the body and hastens its departure from the blood. With small quantities of alcohol in the body exercise increases its combustion at the same rate as that of carbohydrates and fats (Atwater and Benedict). With larger quantities, when its toxic action is greater, exercise does not bring about the same increase in rate of oxidation. A person taking exercise can drink larger quantities of alcohol than one leading a sedentary life because the rate of combustion is increased by the exercise. In conditions of inebriation walking "works off" the effects more rapidly. Probably a part of this action is due to the better opportunity of the central nervous system to restore a perfect co-ordinating mechanism as the result of practice, and partly to the increased rate of combustion of alcohol in the body due to exercise.

6. *Tolerance.*

So far as my experience goes, tolerance as regards alcohol is insignificant as compared with that which develops in the use of morphine. I have seen no evidence that the rate of oxidation is increased in those continually drinking alcohol, nor, if it is taken under constant conditions, have I seen evidence of the development of great tolerance. It remains true, of course, that many factors influence drunkenness—such as the rate of drinking, dilution, size and fatness of the individual, and the amount of exercise being taken. Even the novice can take large quantities of alcohol in the course of a day without being at all intoxicated if he takes it in the right way. If all the circumstances under which the habitué drinks be investigated, and the various influences described above be allowed for, it will be seen that alcohol tolerance is less than is usually thought.

GENERAL DISCUSSION.

PROFESSOR A. R. CUSHNY (Edinburgh) said that the discussion on this subject was to have been opened by the late Dr. Rivers, of Cambridge, whose untimely death they all deplored. Rivers had done some admirable work on the alcohol problem; he was the first to show that in examining the action of alcohol it was necessary to use controls. The discussion would be the poorer for his absence. He himself agreed almost completely with Professor Mellanby's argument. In connexion with the long-disputed question of the food value of alcohol, he recalled the storm which arose when Atwater and Benedict propounded their results. He thought that everyone now recognized that alcohol had some food value—that is to say, it really could yield energy. The body was able to use alcohol as a source of energy just as an engine used coal. This, however, did not mean that alcohol was a desirable food or one to be recommended. Professor Mellanby had given an extreme case in which the value of alcohol had been demonstrated, but that was a medical case, and did not refer to a normal condition at all. Many things could be used to give energy to the body, but regard must be paid to their effect upon the body in other ways as well, for some of them had a poisoning action. Green apples undoubtedly gave energy to the body, but it was a question whether they were good food. Although alcohol conferred energy, it weakened the brain. It was a food, but it was also a poison or a drug. He thought also that the value of alcohol as a food had been greatly exaggerated of recent years. The amount of food to be obtained in alcohol was surprisingly small. A good ordinary pre-war beer, which might be taken as a type, was about equivalent, pint for pint, in food value to a good sweetened cup of coffee containing milk. No one imagined that when he partook of his breakfast cup of tea or coffee he was absorbing a food of any particular value, and the value of beer was no greater. Nevertheless, in certain conditions, notably diabetes, alcohol might be very useful for its food value in a specific case.

The Rev. C. C. WEEKS, M.R.C.S. (Beckenham), said that human economy might be defined, generally, as relating to the science and art of managing the concerns and resources of society and its constituent units, so as to secure the highest degree of efficiency and well-being, and particularly to the operations of nature in the generation, nutrition, and preservation of life or the system under which the functions in health and disease were performed. The present rate of alcoholic indulgence was undoubtedly a powerful coefficient of disease and inefficiency, and when opportunities for drinking were restricted there was a marked diminution of all the conditions thought to be associated with alcoholic indulgence. It had to be remembered, also, that during the last hundred years a great body of experience had arisen as to the value of total abstinence. Professor Cushny's statement that although alcohol had some energy value it was not a recommendable article of food was well borne out by a reference to modern textbooks of physiology, where it was quite well recognized and agreed that alcohol did not repair, build up, or renew the tissues, did not increase the rate of absorption of food, did not promote body temperature, tended to upset the water balance of the cells, had no specific dynamic action, could not be stored in the body for future use, and failed to co-operate with other foodstuffs in stimulating the metabolic processes. On the other hand, alcohol was costly to produce and to purchase, and costly in its effects upon the human organism.

Dr. CHARLES F. HARFORD referred to a paper he had contributed to the Society for the Study of Inebriety on racial psychology in its relation to alcoholism, in which he had put forward a theory of drug dissociation, to which he desired to return. The term "dissociation" was a fundamental one in

psychopathology, but it was not always used in the same way by different teachers, and he himself would give it a wider meaning than many. Cases which had been recorded under the heading of multiple personality were among the most conspicuous instances of this state, but a similar condition was produced by hypnotism, and in a sense there was a definite dissociation taking place in natural sleep. Obviously the condition was not always a morbid one, though in extreme forms it was one of the most striking signs of insanity. After relating particulars of a recent case in which a man convicted of fraud had put forward the defence that he was influenced by alcohol in such a way that it amounted to a case of dual personality, so that he was irresponsible for his actions—a plea the magistrates did not accept—the speaker went on to show that this process of dissociation was common to each stage of the alcohol habit. Three stages were described in the manual published by the Liquor Control Board, *Alcohol, Its Action on the Human Organism*. The first was a feeling of well-being, with a blunting of self-criticism, instanced by a public man, burdened with many cares, who delivered himself of a vivacious and rather irresponsible after-dinner speech, in which he seemed at peace with the world and oblivious to common cares. Dissociation was met with here at an early stage, but it was an important step in a habit which might assume a very different complexion. The power of concentration on one thing, and exclusion of others, was of the essence of self-control, but an artificial dissociation produced by alcohol and kindred drugs tended to weaken the control which was one of the primary factors in sanity and health. To adopt the phraseology of Freud, the "pleasure principle" under the influence of alcohol was in the ascendant, while the "reality principle," which should have served as a drag upon the wheels, was failing to fulfil its purpose. The second stage might be described as that of uncritical self-satisfaction, disregard of conditions normally evoking caution, trespass of conventions previously respected, impaired appreciation of the passage of time, loquacity, and an argumentative frame of mind. This stage was definitely within the domain of psychopathology. Every one of its distinguishing marks characterized also the cases in mental hospitals. These people were insane, but owing to the fact that the cause of the condition was known to be the taking of alcohol, and the symptoms were temporary, they were spoken of as intoxicated. This was a stage in which dissociation was most clearly marked; the "pleasure principle" had asserted itself, while the "reality principle" had become thoroughly ineffective. The third stage was an accentuation of all these symptoms, leading to somnolence and insensibility, or even to delirium. This was dissociation-alcoholism in its most hideous form. It was impossible to discuss the alcohol problem without recognizing its moral implications, and psychology made it necessary to take account of these. If it was true that alcoholism was in the main a disorder of the mind it must be dealt with by the best psychological methods. To attempt to kill the craving for alcohol by enforced confinement could only result in the repressions of Freud or the law of reversed effort of Coué and Baudouin. For his own part, he believed the greatest hope to be in the practice of auto-suggestion, but whatever method was adopted must depend upon the recognition of the psychological aspect of alcoholism.

Mr. THEODORE NEILD, M.A., felt, as a layman, that further information as to the action of alcohol on the body was needed. It was stated that only a definite quantity could be oxidized in unit time by a man of given size at rest, and that it was only with low concentrations that exercise increased the combustion of alcohol. Stronger concentrations seemed so to affect the cells of the body as to reduce the combustion to the low concentration order, and Atwater and Benedict set down only 2 per cent. as secreted. Where did the large balance, beyond the 180 c.cm. or so that could apparently be oxidized, go to? Professor Mellanby, in the Special Report (No. 31) of the Medical Research Council, remarked that with low concentrations it appeared as if some demand were first made on the small quantity of alcohol by some other tissues before the blood received its portion. Was it possible that some such tissue absorption might account for the mysterious disappearance of the balance of heavy quantities of alcohol drunk by some persons? The speaker further asked whether the experiments of Atwater and Benedict had not governed us long enough. The experiments were criticized when they appeared by Professor Gowland Hopkins, and the late Sir G. S. Woodhead had told him that he greatly desired to repeat them. Was it not possible now to repeat those experiments?

Professor W. E. DIXON (Cambridge) was convinced that a discussion such as that could lead to no useful purpose. As Professor Cushny had referred to some experiments by Dr. Rivers, perhaps as he (the speaker) was associated with Rivers in these experiments he might say a few words. Rivers measured the amount of work which men were able to perform, and did it in a very accurate manner; then he gave these men a certain quantity of alcohol and again measured their work. The work always increased under this stimulus. It looked as if, having got his "drop," the man set about to do his very best. But the man had to be given his alcohol every day—sometimes the alcohol was carefully masked—and it was found that the amount of alcohol had to be increased before it had any effect on increasing the output. To the man who had been taking alcohol, 20 c.cm., properly diluted, had no effect in increasing the work; it was not until he increased the potion to 40 c.cm. that the amount of work was increased.

Sir JAMES BARR (Liverpool) congratulated Professor Mellanby on a very able and temperate paper. The advantages of alcohol were not very obvious, and to the person who did not take alcohol it was very difficult to realize any advantages at all. While praising the temperate character of Professor Mellanby's paper, he thought that the doses given in his experiments were intemperate. Mellanby talked of giving 7 or 10 c.cm. of alcohol every hour. In whisky 10 c.cm. was equivalent to about $1\frac{3}{4}$ oz., and in 5 per cent. beer to about 7 oz., and a man who drank a glass of beer every hour of the day would not be in a fit condition for doing much. He did not think there was much use for alcohol in the pharmacopoeia. It was more as a beverage from the social point of view that alcohol should be regarded. He attributed a large amount of the present-day unrest to the expensiveness of alcohol, and added that the murderers and cut-throats in Ireland, Russia, and elsewhere were very largely teetotalers. He would be sorry to see the moderate use of alcohol abolished in this country.

Dr. JAMES CHALMERS (Sunderland) said that as a student he was taught that alcohol, well diluted and taken only with food, assisted digestion. As a medical practitioner of thirty years' standing he saw no great reason to depart from that conclusion. He himself, however, was a total abstainer, in the first place because it required all the wits he could summon to carry on his professional work without any mental handicap from indulgence in alcohol; secondly, because alcohol weakened the will, and if a man began to use it he did not know where he was going to stop; and, thirdly, because an abstainer was free from many degenerative changes from which alcoholics suffered, and if he did have any disease he had a better chance of recovery than the alcohol-consuming person, and the recovery was more complete. At the same time a little alcohol, well diluted, was a valuable adjunct to the treatment of pneumonia and enteric fever.

ALCOHOL IN ITS RELATION TO THE PROBLEMS OF MENTAL DISORDERS.

BY

Sir FREDERICK W. MOTT, K.B.E., M.D., LL.D., F.R.S.

I PROPOSE to discuss the subject of alcohol in relation to mental disorders under three headings, according to my experiences, first, as a member of the Scientific Committee of the Liquor Control Board; secondly, as Physician to Charing Cross Hospital and Pathologist to the London County Asylums; and thirdly, as a neurological expert in the army during the war.

PART I.

The Physiological Action of Alcohol on the Nervous System.

The main effects of alcohol that have any real significance are upon the nervous system. The action of alcohol on the nervous system is essentially sedative, and, with the possible exception of its direct influence on the respiratory centre, is not truly stimulant. The apparent stimulant effects are due to the narcotic effects of alcohol on the highest controlling

centres of the organ of mind, leading to a release from control of the evolutionary lower centres.

"The emotional dispositions or capacities of man are of very ancient racial endowment, and have their physiological localization in the basal ganglia, the lowest levels of the great brain, the parts which are alone represented in the lowest vertebrates. The higher intellectual faculties, on the other hand, are the latest acquired and are connected with the anatomically latest developed parts of the brain. Intermediate between these come, in the order of development, the sensory and skilled motor functions and their nerve centres."

Proportional to the degree of concentration of alcohol in the blood, and thereby in the cerebro-spinal fluid, is the effect in depression or suspension of the functions of the various evolutional levels in the inverse order of their phylogenetic and ontogenetic development. The last to come evolutionally, therefore the least stable and firmly organized, is the first to go. This highest functional psychic level, which is so varied in capacity in different individuals, has developed *pari passu* with progressive evolution of the social instinct. Now the feelings of a civilized human being are largely dominated, and his behaviour determined, by the customs, traditions, religion, and social usages of the community and race. Experience shows that disorders of conduct arising from the effects of alcohol—and in speaking of disorders of conduct I refer to all forms of antisocial conduct, whether it be crime or insanity—are dependent not only upon the quantity of alcohol consumed, and the period over which inebriety extends, but even more upon the inborn degree of organization and stability of this highest psychic level.

Evolutional Levels of Hughlings Jackson in Relation to the Effects of Alcohol.

Hughlings Jackson, in his philosophic paper on the factors of insanities, pointed out that the different depths of dissolution of the evolutional levels, and the positive and negative phases of symptoms arising as a result of successive dissolution of these levels, constituted a basis for the study of insanities. Maudsley has stated, "A drunken man notably exhibits the abstract and brief chronicle of insanity, going through its successive phases in a short space of time." Let us see how far these views accord with the facts.

Alcohol affects as a narcotic the synaptic junctions of all the neurones, but it affects first the synapses of this highest evolutional level, causing at first hypofunction, and later loss of function. The effects are not stimulant on this level, but sedative and narcotic; alcohol thus releases from control the lower levels, thereby permitting a positive phase in the lower levels—for example, a brisk flow of ideas translated into speech and action associated with self-confidence. There is, however, a diminution of self-criticism, deliberation, and judgement when this level is narcotized by alcohol; and this psychic level being inherently of a deficient organization and stability, a small quantity is sufficient to produce this effect. Experiments show that alcohol taken under conditions of restful environment and mental placidity—that is, where there is no external or internal exciting cause—has a sedative effect, and leads to drowsiness and sleep. Consequently, the apparent stimulating effects are due to the narcotic action on the highest psychic level and release of control over the lower levels, which are thereby much more easily roused by internal or external stimulation to activity.

As alcohol concentrates in the blood the second depth of dissolution occurs. This is a progressive falling off of awareness and self-criticism, which is manifested by excited talk, aggressiveness, and inflamed emotions, accompanied by fine sensory-motor disturbances as exhibited in difficulties of articulate speech, diminished acuity of aesthetic sense perceptions, and more or less clumsiness in the execution of fine skilled movements.

In the third stage of dissolution the negative condition of the higher functions of the organ of mind is very great. There is manifest evidence now of affection of lower levels by coarse sensory-motor disorders—for example, double vision, motor inco-ordination, instability of gait and station, incoherent ideas in conversation; on the emotional side the individual is either expansive and quarrelsome, or melancholic and maudlin, the *vin gai* and *vin triste* of the French, and the drunk and disorderly of our police courts.

In the fourth stage of dissolution there is a total dementia and stupor with stertorous breathing, and often incontinence of urine and faeces. Gradually these conditions pass over into a state of deep sleep, after which the patient usually returns to the normal condition. In some cases, however, when the quantity of alcohol taken is very large, the vital centres are so greatly affected that the drunkard may become comatose and die of failure of respiration. It is generally estimated that when the blood content is 0.6 per cent. of alcohol, which amounts to about 14 oz. of absolute alcohol, or nearly a pint and a half of proof spirit, there is a considerable likelihood of death ensuing. The quantity of beer which would contain this amount of alcohol would be over two gallons, so that it is easy to understand that a concentration in the blood sufficient to kill is not so likely to occur with beer as with spirits.

Tolerance to Alcohol of the Habitual Drunkard.

As a result of continued use, tolerance can be acquired, so that the habitual drunkard may consume, without becoming intoxicated, quantities of alcoholic beverages which would cause well-marked signs of drunkenness, or even prove fatal to the person not accustomed to it. The acquisition of tolerance, however, implies a removal of a protective mechanism, for it allows the drunkard to imbibe daily quantities of alcohol which he could not have taken if his brain had retained its normal power of reacting to it; eventually he becomes a chronic inebriate, and develops sooner or later pathological conditions.

PART II.

I will now pass on to my experiences as Physician to Charing Cross Hospital and Pathologist to the London County Asylums. These were the subject of a report to the International Congress of Psychiatry held in Amsterdam in 1907.

Unreliability of Asylum Statistics in Relation to the Influence of Alcohol in the Production of Insanity.

The statistics relating to alcohol and insanity in the London County Asylums (for thirteen years) show that the percentages of admissions in which alcohol was the asserted cause of insanity varied considerably in different asylums in the same years and in the same asylum for different years, and the differences were so great that the collected statistics derived from this source are not reliable. The personal equation of the medical officers who obtained the information and the friends who gave it, as to what constitutes alcoholic excess, and as to how far alcohol is an efficient cause, or merely a coefficient in the production of insanity, was variable. Thus in one year, 1902, from the same class of people, alcohol is the assigned cause of 25.6 per cent. of the admissions to Hanwell, and to Claybury 11.2 per cent.; but in 1906, in 23 per cent. of the admissions to Claybury intemperance is the assigned cause, while at Colney Hatch it is only 14 per cent. At Bexley, where the statistics appeared to be fairly uniform since its opening, intemperance as an assigned cause was high, the average being 22.8 per cent. for the seven years; but an analysis of the cases admitted during 1905 to this asylum, in which intemperance was the assigned cause in 25.7 per cent. of the total admissions, shows that there were many in which other causes were associated. Thus, out of 248 male admissions, alcoholic excess was the assigned cause in 46, or 18.5 per cent., and out of 246 female admissions alcoholic excess was the principal cause in 33, or 15.4 per cent.—a total percentage on the whole admissions of 17 per cent. But when we inquire into these cases, we find that 13 were imbeciles, 5 were cases of chronic delusional insanity, 5 were epileptic, 5 had organic dementia, and no less than 20 were cases of primary dementia. In fact, out of the 84 cases quite one-half were lunatics or potential lunatics and the subjects of an inborn tendency to mental disease. My experience at Hanwell, Claybury, and the other asylums I visited corroborated this statement.

The Histories in the great Majority of Cases in which Alcohol was an Assigned Cause show an Inborn or Acquired Intolerance.

I have found that the notes show hereditary insanity or epilepsy quite as frequently in these so-called alcoholic cases as in other forms of insanity, and more frequently than in general paralysis. In the histories of these cases of insanity as a result of intemperance we find frequently potential insanity, chronic alcoholism in one or both parents, inherent instability in the form of neuropathics, imbecility, criminal degeneracy, epilepsy, and intolerance of alcohol as manifested by previous admissions, when they were termed recurrent mania, recurrent melancholia, sometimes head injury, brain

disease, or incipient general paralysis. Suicidal tendency and active attempts at suicide, occasionally murderous assaults or homicidal tendencies, indecent assaults upon children, rape and other sexual crimes are occasionally met with in the histories. Again, the history frequently reveals that the patient has taken to drink on account of domestic troubles, bodily illness, loss of money, breaking up of the home, and all those conditions of life in which alcohol is at first taken to obtain temporary relief by those who are burdened with sorrow and despair, the ill-fed and miserable, subjects of mental and bodily suffering. Those, again, who, owing to a suspicious or melancholic inborn temperament, can perforce only see the black side of life, who are potentially insane, under the toxic influence of alcohol develop hallucinations and delusions of a persecutory character.

Polyneuritic or Korsakoff Psychosis, the Type of Insanity in which Alcohol is the Essential Cause.

The types of insanity in which alcohol is the *essential* cause are not nearly so frequently seen in asylums as is generally supposed; they differ but little from the cases met with in hospitals. They are delirium tremens, mania a potu, and polyneuritic psychosis, or Korsakoff's disease, which is generally regarded as a form of chronic delirium tremens, and affects women more frequently than men. Doubtless a considerable number of pure alcoholic cases are kept in the infirmaries, and only those in which the mental symptoms are pronounced and prolonged are sent to the asylums. We may thus divide the cases of alcoholic insanity met with in asylums into two great groups:

I. Those with intolerance to alcohol, owing to a *locus minoris resistentiae* in the nervous system, especially of the highest evolutional level. These cases are the most numerous.

II. Those in which chronic alcoholism, usually in conjunction with some other factor, such as syphilis, tuberculosis, microbial toxaemia, arterio-sclerosis, head injury, or organic brain disease, induces sooner or later either delirium tremens, polyneuritic psychosis, or alcoholic hallucinosis.

Consequently, cases belonging to Class I can very seldom drink sufficient alcohol extended over a sufficient time to produce advanced cirrhosis of the liver with ascites. A good many may drink sufficient to produce changes in the liver discoverable by microscopical examination, but very few sufficient to produce a change recognizable by the naked eye.

Class II, however, includes cases of alcoholism affecting persons of an inborn stable mental organization as a rule; consequently it is in such cases especially that we find the few cases of large, fatty, and cirrhotic liver on the *post-mortem* tables of asylums.

Statistics of Post-mortem Examinations in Hospitals and Asylums Compared.

If, now, we compare the statistics of hospital and asylum *post-mortem* examinations we are struck with the fact that in the former there are a large number of cases of advanced cirrhosis of the liver, whereas in the latter there are relatively few, and many of those only recognizable with difficulty. I will throw on the screen a statistical analysis of the results obtained in 1,099 autopsies on adults at Charing Cross Hospital, compared with 1,271 *post-mortem* examinations at Claybury. An analysis of the results obtained by Sir Humphry Rolleston and Dr. Fenton on *post-mortem* records extending over ten years at St. George's Hospital is given, and in the main it supports the opinion that the statistics derived from Charing Cross Hospital agree with those which could be obtained at other London hospitals.

The principal points of interest which this tabular synopsis of a comparative inquiry into the *post-mortem* incidence of cirrhosis of the liver at Charing Cross Hospital and Claybury Asylum afford in relation to the subject of alcohol and insanity may be thus summarized:

At Charing Cross Hospital the notes of the autopsies upon 1,099 adult cases were examined—735 males and 364 females. Of this number there were 85, or 7.7 per cent., cases of cirrhosis of the liver, which accords closely with the 8 per cent. in which alcohol was the immediate and direct cause of the disease for which patients were admitted to the hospital. The percentage of males was 9.1, and of females 4.9.

At Claybury Asylum the notes of 1,271 autopsies were investigated (627 males and 644 females). Of this number only 23 cases of hepatic cirrhosis were found (14 males and 9 females). The total percentage of cirrhosis of the liver works out at 1.8 per cent. (males 2.2 per cent. and females 1.3 per cent.).

There are a number of points of interest to which the synopsis refers, but I will limit my remarks thereon to the following more important facts which have been elucidated—namely, that no case of cirrhosis *with ascites* occurred at Claybury Asylum, whereas of the cases of cirrhosis at Charing Cross Hospital 66.6 per cent. had ascites, 22.2 per cent. with a history of paracentesis abdominis. At Claybury, in only one instance of the 23 cases was cirrhosis of the liver mentioned as the assigned cause of death, whereas at the hospital in 72.2 per cent. of the 85 cases cirrhosis of the liver was assigned as the cause of death. The cases of cirrhosis of the liver met with on the *post-mortem* table at the asylum were mostly cases of polyneuritic psychosis and alcoholic dementia, but there were also a few cases of general paralysis. The single case in which cirrhosis of the liver was the cause of death occurred in a chronic alcoholic billiard-marker, who was admitted to the asylum because he had attempted suicide. This man had previously given himself up to the police as having murdered a woman, which was a delusion. When in the asylum he knew that he suffered with cirrhosis of the liver, and he stated that he felt so miserable on this account that he had attempted suicide. The liver weighed over 2,000 grams. The relatively greater frequency with which acute and chronic gastritis and other inflammatory lesions of the stomach are met with in cases of alcoholic affections of the liver among the insane is shown.

There is a greater frequency of arterio-sclerotic changes associated with cirrhosis of the liver in the case of the insane, especially among the males. Atheroma and pearly fibrosis of the aorta is common on the *post-mortem* table, even in comparatively young people, in asylums. Probably this is explained by the fact that a large proportion of the deaths occur in the subjects of general paralysis, due to the syphilitic origin, acquired or congenital, of this disease.

It may be remarked that in only four of the fatal cases occurring at the hospital were there nervous symptoms associated. In fact, it is noteworthy that alcoholic cirrhosis of the liver with pronounced ascites and a history of prolonged intemperance, even excessive intemperance, frequently occurs in individuals who show absolutely no mental symptoms beyond a weakened will and loss of moral sense, shown by the indulgence of a vicious habit.

Regional Dissociation between Alcoholism and Insanity.

I would therefore agree with Dr. Sullivan[1] and Dr. Bevan Lewis[2] that alcohol as an *efficient* cause of insanity is not so great as the published reports of the Lunacy Commissioners indicate. In support of this I will briefly indicate some of their arguments. Dr. Bevan Lewis has shown a regional dissociation between alcoholism and insanity. Thus inland and agricultural communities were the least inebriate, but had the highest ratio of pauperism and insanity; while maritime, mining, and manufacturing communities above all others were the most intemperate, and revealed the lowest ratios of pauperism and insanity. Dr. Sullivan, by careful analysis and tables, shows conclusively that in the regional distribution of insanity it is difficult to trace any evidence of alcoholic influence such as might be expected if alcoholism really accounted for a sixth of the total number of cases. Thus Lancashire, Warwick, and Cheshire, which rank very high in the scale of alcoholism, and the mining counties, where drunkenness is very rife, are alike in showing very low rates of insanity. He concludes that alcohol, as the essential cause of certified insanity, falls a good deal short of the 16 per cent. at which it is rated in the official statistics, and may possibly be something under 10 per cent.

Intolerance of Alcohol in Mental Defectives.

Dr. Branthwaite, in his Report of 1905 concerning certified inebriate reformatories established under the Inebriates Acts, 1879, 1900 (p. 10), remarks:

"Upwards of 62 per cent. of the persons committed to reformatories under the Act are found to be insane or defective in varying degree. I am satisfied that the majority of our insane inebriates have become alcoholic because of congenital defects or tendency to insanity, not insane as the result of alcoholism, and that the drunkenness which preceded alcoholic insanity was merely the herald—the only obvious sign—of incipient mental disorder. In relation to the final insanity, drunkenness in such cases is the intensifier perhaps, but not the cause of the disease."

Concerning the congenital defectives, who are divided into two classes—(*a*) comprising degenerates, imbeciles, and epileptics, and (*b*) moral and social defectives—he remarks:

"A marked intolerance to the action of alcohol is present in both refractory and quiet class of defectives, very small quantities of

drink, no more than is taken daily without apparent physiological effect by an ordinary individual, being sufficient to cause disorderly and violent behaviour. Our experience in this direction has led us to accept the view that intolerance to the exciting effects of small quantities of alcohol may be considered a fairly certain sign of impaired mental equilibrium."

I think I have given sufficient evidence to show that the effects of alcohol depend not only upon the quality and quantity taken but also upon the personality of the individual who takes it.

The Different Pathological Effects of Alcohol upon Different Individuals.

We are prepared now to understand how very different is the effect of alcohol on different individuals. Let us consider first the well-fed workman, business or professional man of normal mental stability, who on account of his occupation becomes the victim of a vicious habit of indulgence in alcohol to excess. The normal sense of well-being in such an individual which comes from physiological nutritional equilibrium is gradually perverted and replaced by an artificial sense of well-being, owing to the effect of the alcohol. Sooner or later visceral disturbances—notably gastritis—lead to loss of appetite and failing nutrition, with more or less persistent *disorder of his organic sensibility*. The craving for spirits replaces the desire for food, and the vicious habit has so altered his nervous system that it can no longer function without stimulant. For a time the symptoms of disordered organic sensibility due to chronic alcoholism—namely, pain and oppression in the region of the heart, dyspepsia, anorexia, nausea, and morning vomiting, muscular weakness and tremors—may be relieved by alcohol, but the quantity taken has to be steadily increased to produce the desired effect. A head injury, microbial infection, an extra bout of drinking, and the sudden withdrawal of the alcohol, may lead to delirium tremens, when the drinker becomes dangerous to himself and others. Such subjects of chronic alcoholism may live until advanced cirrhosis of the liver with ascites occurs, from which they eventually die after repeated operations for paracentesis. It may be presumed that they possessed an inborn stable mental organization, and, without having any precise statistical data to prove it, I am of opinion that they would transmit to progeny the stable mental organization they inherited rather than the weakened will power which they had acquired by force of circumstance of environment.

The frequency with which crimes of violence, murderous assaults, and homicide occur as the result of chronic alcoholism indicates that, owing to the loss of control, the natural emotion anger, with its derived sentiment courage, are converted into fury and recklessness. Again, the frequency with which suicide occurs as a result of chronic alcoholism indicates that the normal sentiment of sorrow becomes despair owing to degradation and inability to struggle against adversity. The sentiments of joy and sorrow are strikingly exhibited by the effect of alcohol on two opposite temperaments, and the French speak of the *vin gai* and the *vin triste* types of drunkenness. The narcotic effect of the alcohol on the evolutionally highest psychic level in the chronic inebriate permanently weakens self-criticism, and leads him to become the subject of a vicious habit over which he has no control. Then an extra bout of drinking may lead to criminal actions; such a person, however, is not deemed insane.

Again, chronic alcoholics are very liable to sexual crimes, rape, and indecent assault, also to exhibitionism, assaults on children, and various sexual perversions. According to Dr. Sullivan (*Alcoholism*, p. 164):

> "Prison statistics indicate that 60 per cent. of graver homicidal offences and 82 per cent. of assaults are attributable to alcohol, and that in nearly all the cases of the former class and in four-fifths of the minor offences the intoxication had attained a fair degree of chronicity."

To a less degree sexual crimes are due to chronic alcoholism. Thus we know that a chronic alcoholic may be more antisocial although uncertifiable than a certifiable lunatic. The release of highest control inflames the emotions, and it is not surprising, therefore, to find that alcoholism is responsible for a large proportion of the crimes of violence.

It may be asked, How is it that many of these chronic alcoholics in all stations of life are such good skilled workmen and artists? Because individual character also results from one or several inherited tendencies, and the master intellectual feeling—that with which his whole nature is imbued, and the actions of which have by conscious repetition become *subconscious and habitual*—may persist when other feelings have become perverted and gone. Even the *aesthetic feeling*, which is the last to come evolutionally, therefore normally the first to go, may, owing to its constant, habitual, and subconscious activities in associative memory, tolerate better the degrading effects of chronic alcoholism and resist longer the work of destruction than the moral sense; even the elementary feelings of right and wrong may be lost or perverted and the aesthetic sense remain. Thus a chronic alcoholic artist may by his conduct be antisocial and yet still delight the public by his art, whether it be painting, sculpture, music, poetry, or the drama. It is sometimes brought forward as an argument in favour of the use of alcohol that some of the greatest artistic geniuses have used it even to excess. It is assumed that it has stimulated their emotions and imaginative faculties, even if it weakened their will power, and having made them indifferent to social customs, their aesthetic feelings and passions were given full play without restraint. But "poets are born, not made," and their poetic imagination persists in spite of alcohol.

Chronic alcoholism may be manifested in the patient's conversation in various ways. There is often a remarkable tendency to wit and humour, but not infrequently the mental association is rather by rhyme and repetition of well-worn jokes, abusive epithets, and coarse, vulgar stories, with occasionally keen repartee and warm-heartedness. Again, boastful loquacity, untruthfulness, loss of power of attention, and the tendency to relate pseudo-reminiscences, is a common symptom of chronic alcoholism (the character of Falstaff).

Alcoholic Insanity.

Both in hospital and asylum practice delirium tremens is much more frequent in males than in females; whereas polyneurotic psychosis is much more frequently met with in females than in males. Both occur in the subjects of chronic alcoholism. Women often take to drink because of the pains experienced at the menstrual periods, and on account of disease of the reproductive organs following miscarriages, abortion, and venereal infection. I have, moreover, so often found, *post mortem*, metritis, parametritis, and salpingitis in cases of alcoholic paraplegia, that I have thought it probable that the toxins engendered by microbic infection, carried up the lymphatics of the nerves, have exercised an important causal relationship to the polyneuritis.

As a rule the convolutional pattern of the brain in these cases of polyneuritic psychosis denotes a fair order of intelligence, and the wasting of the convolutions and the thickening of the membranes is slight as compared with that occurring in general paralysis.

There is a form of alcoholic dementia of the expansive form that simulates general paralysis. The patient may suffer with delusions of grandeur associated with some evidence of neuritis, but a diagnosis can always be made by an examination of the cerebro-spinal fluid.

The changes in the brain in alcoholic dementia are not marked as a rule, and do not, in my opinion, account for the symptoms as they do in general paralysis, where the dementia is in great measure proportional to the cortical destruction.

The great proportion of cases which are statistically included under alcoholic insanity occur in persons of an inborn or acquired unstable mental organization—epileptics, degenerates, imbeciles, potential lunatics, general paralytics, subjects of head injury, local brain disease, syphilis, and arterio-sclerosis.

If alcohol is the essential factor, however, in the production of an insanity, there will be certain specific indications in the varied forms of insanity pointing to the more or less specific action of the alcohol. Even in the absence of a history of alcoholic indulgence there are certain physical signs and symptoms which point to alcohol as the cause. The more definite these signs and symptoms the more certain can we be that the cause is removable and the more hopeful the prognosis. These signs and symptoms are found most pronounced in the two conditions of mental and nervous disorder which occur in hospital practice—namely, delirium tremens and polyneuritic psychosis.

Polyneuritic Psychosis—Korsakoff's Disease.

Although every form of mental derangement may be closely simulated by alcohol when an insane temperament is acted

upon by a sufficient quantity of the poison, yet when alcohol has been an efficient cause in the production of the insanity there are certain indications in the character and constancy of the illusions, hallucinations, and delusions. Illusions of identification of persons are common. The hallucinations and delusions are generally of a persecutory nature, and are possibly due to a deranged and perverted organic sensibility of the body and viscera. In one case a woman with polyneuritic psychosis said her body was on fire and she tried to get out of the window. The next day blebs occurred on the body, and I found acute degeneration of the nerves going to these patches of skin. Often the woman fancies she hears the baby crying and that it is in the bed. Delusions of marital infidelity are especially common in men and may lead to homicidal assaults. Loss of orientation in time and space and of memory of recent events is usually met with, likewise a tendency to pseudo-reminiscences and mental confusion, which in some cases amounts to incoherence, and may then overshadow completely the disturbance of memory. Purposeful motor restlessness, hallucinations, and delusions are common, and tremors of the tongue and the small muscles of the face. Moreover, alteration of the deep reflexes, tenderness on deep pressure of the muscles, anaesthesia, paraesthesia, hyperaesthesia—indicative of neuritic affection—are frequently present, singly or combined.

Alcoholic Hallucinosis.

The cases of alcoholic hallucinosis may, however, show very little or no mental confusion and amnesia, and hardly any loss of orientation. They tend to recover within one to six months after admission, but relapses are frequent. Since auditory and visual hallucinations, especially the former, frequently occur in insanity in which there is no alcoholic factor, it is often difficult to decide simply by the hallucinations and delusions alone whether alcohol is the cause. Should they persist, however, while the mind otherwise becomes clear, it is highly probable that the case is one in which alcohol has only played a subordinate part, and the outlook of recurrent or chronic insanity is probable. This is all the more likely to be so if the hallucinations and delusions become systematized and if there is a complete absence of any peripheral cause.

Dipsomania.

A periodic form of alcoholic insanity, akin to recurrent mania, is met with, termed "dipsomania." Persons who in the intervals are decent sober members of society, leading, perhaps, a blameless life with no intellectual or moral defects, are seized with a craving for drink. Often long periods of normal conduct occur between periods of debauch, in which they go on drinking day after day, taking little food and getting little sleep, until exhaustion from want of food sets in, and, tremulous and miserable, the craving being at last satiated, they return to their home and occupation until another attack occurs. There is usually a morbid nervous inheritance in these cases, and it is regarded by many authorities as a form of manic-depressive insanity.

Alcohol and Syphilis.

Here I would call attention to the effects of alcohol in the spread of venereal disease. Syphilis is so often acquired as a consequence of alcoholic intoxication that the effects of the contagion are frequently attributed to the alcohol.

PART III.

Alcohol and War Neuroses and Psychoses.

An inquiry which I made regarding the influence of alcohol in the production of war neuroses and the value of the rum ration was of interest in relation to the inborn temperament and alcohol. By a card system I found that at least 60 per cent. of 147 cases which were admitted under my care to the Maudsley Neurological Section of the 4th London General Hospital in 1917 were total abstainers, which was double the percentage of 62 cases admitted to Ruskin Park Hospital suffering with wounds or diseases other than functional nervous conditions.

The high percentage of total abstainers among cases of war neurosis and shell shock was associated with fear of the consequences of drink, or a dislike of the taste of drink, consequently refusal to take the rum ration. Fear of the consequences, in a great number of instances, was due to the results in the home of paternal drunkenness, and in fewer instances of maternal drunkenness, or drunkenness in both parents.

It was observed that a number of total abstainers admitted that the rum ration had been beneficial, and that they had taken it when they had to "stand to" in the trenches wet and cold in the early morning, prior to getting over the parapet for an attack.

Moreover, I questioned a number of officers of all ranks, even including advocates of temperance, and with very few exceptions they were convinced of the value of the rum ration if it were given out by an officer who saw that no soldier obtained more than his ration. They emphasized its utility as a stimulant when the men were wet and cold and had to stand to at dawn; it put the feeling of warmth in them, and gave them the necessary stimulus and ardour to go over the parapet for an attack. The general recommendation was to give it in the tea, and the men preferred it so; only a few cared for it neat—it was too strong. Many officers and men were of opinion that on returning to billets, cold and wet through, a rum ration produced a comforting feeling and promoted sleep.

It was the almost unanimous opinion of the witnesses who gave evidence before the Shell Shock Commission that the rum ration given under the conditions above mentioned was most useful, and the conclusions of the Advisory Committee of the Central Control Board (Liquor Traffic) was as follows:

"*Alcohol, its Action on the Human Organism.*—The main effects of alcohol that have any real significance are due to its action on the nervous system. So far as direct action is concerned, alcohol, when administered in moderate doses in dilute form and with sufficient intervals, has no effect of any serious and practical account. The action of alcohol is not really a stimulant to the nervous system, but a sedative to the highest centres of control, and acts by causing a decrease of critical self-consciousness and anxiety.

"When stimulation of nervous function is really needed, and when the individual has to meet an emergency which calls for the exercise of his highest powers of perception and judgement, alcohol is not merely useless—it is certainly and unequivocally detrimental. On the other hand, there are emergencies when, though the individual may also imagine that he needs to be braced up nervously, he would be assisted far more by a relaxation than by an increase of tension; and here the sedative action of alcohol, so far as the immediate effect is concerned, may be advantageous. The value widely attributed to the rum ration, under the conditions of acute discomfort, cold, and strain inseparable from trench warfare, may be explained in this way."

Captain J. M. Wolfsohn,[3] of the American Army Medical Service, at my suggestion investigated the personal history and the leading nervous state in 100 of my cases of soldiers suffering with shell shock or war psycho-neuroses (neurasthenia and hysteria) and compared the same with 100 surgical cases suffering with wounds under the care of Captain Turner at the 4th London General Hospital, and found that the vast majority of the psycho-neurotic cases studied were among soldiers who had a neuropathic soil. In 74 per cent. of these cases a family history of neurotic or psychotic stigmata, including insanity, epilepsy, alcoholism, and nervousness was obtained, whilst a previous neuropathic constitution in the patient himself was present in 72 per cent.—a striking contrast to the percentages obtained in the wounded cases.

Finally, a quantity insufficient to affect the normal human being is enough to render the individual with an invalid brain antisocial; consequently cases of shell shock, mental deficiency, neurasthenia, epilepsy, and head injury are very susceptible to the toxic effects of alcohol. According to the experience of Major Hotchkiss at Dykebar Asylum, between cases of delirium tremens and the chronic delusional form of alcoholic insanity are those cases which show such varied symptoms as mental confusion, depression, subacute excitement, and in practically all cases hallucinations.

"The history of many of these cases suggested that though alcoholism was a prominent feature in predisposing to a mental breakdown, of still greater importance was the stress and strain of the campaign, and had it not been for this, breakdown would never have occurred or would have been postponed."

Probably the family history in many of these cases of alcoholic hallucinosis would show an inborn neuropathic tendency.

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GENERAL ETIOLOGICAL FACTORS IN THE ALCOHOLIC PSYCHOSES.

BY

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WHEN I was honoured with an invitation to read a paper to this important gathering on the subject of alcohol in relation to mental disease, my first thought was that, as an American psychiatrist, I would be expected to discuss the effects of prohibition on the incidence of insanity. Unfortunately the time was too short to allow of my getting the latest statistics on the subject, as that would involve considerable correspondence back and forth. Then it occurred to me that if I had the statistics I would feel it a most unsafe thing to draw any conclusions from them, and that you might be interested in having a discussion of aspects of the alcohol problem which social reformers and many medical men are apt to overlook.

When I express scepticism as to the reliability of current statistics I would not have you assume that I refer to the alleged failure of prohibition to prohibit, which is so much advertised in this country. No one imagined when the constitutional amendment was passed that all alcohol would spontaneously evaporate. Even enthusiastic reformers knew that certain sections of the population would endeavour to evade the law and often succeed; moreover, the possession of liquor was not banned, and those who wished and had the money were in a position to fill their cellars before the law was enforced. Further, one must remember that drinking in the home is not illegal. So, if a guest from this country be given a cocktail before dinner by his host, he has no right to assume that any law has been broken. Nevertheless it would be foolish to claim that there is no illicit traffic. Public opinion—if one can gauge that by the verdicts of juries—is ready to back up prosecution of those who import and sell alcoholic beverages for gain. It is not so antagonistic to their domestic manufacture. In consequence there are two sources for post-prohibition liquor, and these involve radical modifications in the type of drinking. "Boot-legging"—that is, illicit traffic in alcohol—means expensive liquor which must be concentrated to make it pay. Those who buy must therefore have money to spare and are often apt to consume what they can get more greedily than if future supply were assured. Further, the quality of what is secured in this unlicensed manner is not guaranteed. On the other hand the drinks most easily made in the home are beer and light wines. Those who demand alcohol and are not in a position to buy are reduced to beverages of low percentage. Some people with sufficient technical skill distil at home, and these are apt to consume raw and highly poisonous spirit. Above all, it must be borne in mind that the saloon, in the sense of a place where a man could stroll casually in to take one drink, be treated, stand treat, and eventually leave dead drunk—the saloon has disappeared, and in all probability for good.

We see, then, that drinking has changed both in quantity and quality. The rich man has good wines and spirits from pre-prohibition days or may buy stuff of indifferent quality. The poor man no longer has spirits, but can, if he takes the trouble, drink wines and beer. There is, probably, much less alcohol consumed now than there was. Even if more insobriety be observed in certain social sets there are fewer drunken people in the streets and hospitals. But, if one is to draw conclusions, one way or another, from the state of affairs now existing he would be liable to error, for the change in type of drinking is in progress. The evolution is not complete. The excitement of smuggling will certainly abate in time; social emulation as an incentive for the procuring of liquor may either be fixed as custom or entirely pass away. Domestic manufacture of mild alcoholic drinks may develop into a recognized household art, be legalized, and produce a nation of moderate drinkers. These are fields for pure speculation, and I have mentioned them only to indicate the folly of trying to draw conclusions of any permanent value from conditions obtaining in America to-day.

There is another factor which may tend to vitiate current psychiatric statistics. We have not yet finished with the war. This social upheaval tends both to increase and decrease the present incidence of insanity. Certain factors, such as the economic unrest and the violent changes in moral and social outlook, inevitably make difficult the maintenance of balance in the mentally unstable. On the other hand, the high proportion of insanity in military life may tend to reduce its incidence some years thereafter. In the American army, at least, the number of definite psychotic breakdowns has always been higher than in the same age group in the civilian population. When these patients are examined it is found that they had, many of them, typical dementia praecox personalities. It is not impossible that frank psychoses would inevitably have occurred anyway, and that the strain of adaptation to rigorously disciplined life merely brought them on earlier. In that case one would now expect a lower rate of chronic mental disease of the constitutional type since so many candidates have already met their fate. One could go on indefinitely with such arguments, always reaching the same conclusion: that we can infer nothing of permanent value from the contemporary insanity rate.

But this is not my theme to-day, which is rather consideration of the factors that always operate to confuse the study of alcoholic psychoses. The problem may be approached from two sides, although the same phenomena often seem of equal importance when viewed from the two angles. The first question is of the psychological need for excessive potation and the other is of the causes operating to produce the symptoms of so-called alcoholic psychoses. By discussing the latter first, we may from a study of the effects produced by alcohol deduce something which may throw light on the reasons for its consumption.

The simplest of all mental disturbances ascribed to alcohol is delirium tremens. Here we have a group of symptoms all of which point towards an acute intoxication of the central and involuntary nervous systems. It is not necessary to recapitulate these symptoms before this audience. It will be sufficient to point out that the mental aberrations take the form of clouding of consciousness, with disorientation, etc., and hallucinations. The latter are, in uncomplicated cases, usually of small moving objects; quite possibly these are false interpretations of entoptic phenomena. At any rate all the psychotic features are of a kind we are accustomed to speak of as "organic" rather than "functional." Functional symptoms are "psychogenic"—that is, they may be demonstrated to have a psychic history, to be products of the instinctive or emotional conflicts of the patient. For instance, if a thwarted ambition reaches fulfilment in a delusion we speak of this imagination as psychogenic or functional. Nothing of this kind may appear in delirium tremens, although the bizarre hallucinations which sometimes occur may have a symbolic significance suggestive of previous unconscious elaboration. On the other hand all the obvious symptoms point to an acute poisoning of the nervous systems. Some toxin is directly injuring the machine rather than there being a perversion of the forces which operate it.

Another condition in which the mechanism of the brain seems to be directly affected is that rarer state known as the Korsakoff syndrome. Here we have a sudden onset of delirium with polyneuritis. This delirium is of a definitely organic order with clouding of consciousness and occupational hallucinations. As it clears up the patient is left with a peculiar memory defect in which he cannot properly register or recall current impressions. This last symptom is, of course, of a purely organic order. The etiology of the Korsakoff syndrome is not simple, however. It may occur with other than alcoholic intoxications, although infrequently. Moreover, just plain hard drinking does not seem to produce it, for one finds that the patient has, as a rule, been eating no food for some weeks and has been subsisting on alcohol alone or nearly so. Finally, it has a seasonal incidence. The peak of the curve in New York State comes in the early fall, about the month of September.

The third plainly organic condition is that of gradual slowing of the mental processes, with memory and consequent judgement defect. That is usually due to an arterio-sclerotic affection of the brain, and, of course, when one is dealing with arterio-sclerosis one is always faced with a complicated problem in etiology. Alcohol in these cases is always only one, and often only a contributory, factor.

From these examples we learn that alcohol may affect the brain, either acutely or chronically, to disturb and retard the

intellectual or mechanical functions of the mind. This destruction may proceed to such lengths as grave dementia.

When we turn to the other alcoholic psychoses, to the ones which cause most social complications, a rather marked contrast is apparent. The simplest of these is known as the acute alcoholic hallucinosis. At the close of a spree the patient suddenly begins to hallucinate attacks being made upon him and to hear voices accusing him of homosexual practices. This mental content is extraordinarily stereotyped. As a rule the psychosis lasts only for a few days and may even clear up before the patient can be certified. In contrast to the psychoses we have been considering these cases show no clouding of consciousness, defect of memory, or any such symptoms. They seem merely to have been suddenly possessed with queer ideas of extraordinary vividness, and after recovery they seem just as normal as before. A few drinks in many normal persons will produce as much disorientation as is shown by these patients. On the other hand these attacks are apt to recur, and in later ones they may not lead to recovery but glide over into dementia praecox. Moreover, dementia praecox patients may show episodes with practically identical symptoms, although the subjects are abstainers; or the alcoholic hallucinosis may appear after drinking a relatively small amount of alcohol. Such facts have led some psychiatrists to think that this psychosis is virtually a psychogenic reaction liberated by alcohol; that it is, so to speak, an acute dementia praecox reaction, essentially constitutional, that appears when alcohol removes the normally acting inhibitions.

Probably the most troublesome of all alcoholic patients are those in the paranoid group. Such individuals may be normally sociable and good-tempered but after a drink or two imagine slights or insults and become dangerously quarrelsome. Many details lead one to suppose that here again we are dealing with constitutional anomalies. Even when free from alcohol or before drinking has begun the subjects are apt to show peculiarities. They are frequently women-haters and affect the society of men exclusively. (Many overt homosexuals are recruited from their ranks.) They have difficulty in adapting themselves to any kind of discipline and rebel at authority. The foreman or manager is apt to be regarded as a prejudiced tyrant. They are not well adapted people—that is to say, their adjustments to social life are not easy and automatic. The corollary to this is, of course, that antisocial tendencies are latently strong in them. Drink brings the latter to the surface. Marriage makes the most persistent demand for social adaptation that we know of. This is the reason why so many of these men begin to drink only after marriage. The innate rebellion at this bondage appears when alcohol has liberated their inhibitions. They first become querulous and beat or abuse their wives every Saturday night. Later, when drunk, delusions of unfaithfulness appear which may become fixed. It may only be when this last stage is reached that cognizance is taken of what was mental disease from the first. The fate of these creatures is often pitiable. They are certified and interned. Once in the asylum, which for them is a house of refuge, they are free from the demands that have been too much for them to meet, and consequently their mental symptoms clear up. So they are liberated. But after a few weeks or months in the old environment the temptation to drink becomes more than they can withstand. Soon the whole story is repeated, but the dénouement is reached more quickly. After a few such disillusionments the authorities cease their efforts to maintain such patients in the outer world and they are incarcerated for life although showing few if any gross symptoms. Nothing but forced detention in well-organized industrial colonies can ever solve this problem.

The last type of alcoholic mental disease which we shall consider is difficult to describe, for its symptoms are indefinite. It consists in a gradual deterioration, a degradation of emotional rather than of intellectual process. In this it is to be distinguished from the arterio-sclerotic type, where memory and intellectual capacity generally are primarily affected. Here, however, with such faculties intact, or relatively so, the patients gradually become indifferent to their responsibilities, lose ambition, their affections wane. Often some paranoid ideas are present, or they may merely become bad-tempered. They are pathological loafers, good-for-nothings. Most of these cases do not find their way into institutions. They are not mad enough to be regarded as dangerous, so they merely ruin the home in an undramatic way. This deterioration is a good deal like that seen in some cases of dementia praecox. Etiologically it is a question impossible to decide which is more important—the constitutional factor, or the physical effects of protracted poisoning with alcohol. If the latter operated alone we would expect to get a dementia of the arterio-sclerotic or senile type.

Even from this outline of the alcoholic psychoses it can be gathered that the etiology of these conditions is relatively pure only in the cases of delirium tremens and the Korsakoff syndrome. If, under this heading, one were to include these conditions alone the psychiatric significance of alcohol would be scientific rather than social, for these two psychoses are not of any great consequence statistically. The ravages laid at the door of alcohol are those attributable to other factors as well. In general terms one can formulate the rôle of this poison by saying that it liberates abnormal reactions that have been latent and at the same time increases whatever fundamental tendency to abnormality there may be. There is, then, a vicious circle.

To see exactly how this comes about a little analysis is necessary. We have seen that there are two general effects which alcohol produces. It dulls the intellect, either acutely or permanently; it stupefies. Secondly, by removing inhibitions, it liberates antisocial tendencies that have previously been unconscious. These antisocial tendencies are inextricably mingled as both cause and effect with general maladaptation. To prove this would require a long dissertation, but the nature of the argument may be indicated. Our individualistic strivings are repressed to the unconscious. If we are adaptable we can give some outlet to them in a socialized form as permissible personal ambitions. If we fail in adaptation these unconscious complexes tend to appear in a less permissible form. In other words, if we are happy and successful our unconscious minds are placated with indirect outlet and do not cause trouble, but if we are unsuccessful and unhappy we at once are apt to become antisocial. This disturbs adaptation, thus producing more failure and mental discomfort. Maladaptation and autonomous unconscious individualism therefore react mutually on one another as cause and effect.

We can now discern the psychological rôle which alcohol plays. Adaptation means contact with reality. When this is difficult to maintain one instinctively yearns to abolish reality or blot it from sight. Any drug which stupefies will do this. Hence the man who wants to forget the world drinks. He gains the desired release. If this were all, alcohol might be an unmixed blessing as an emergency measure. But unfortunately this release is purchased by impairing those very faculties that are needed to attain success, and, to make matters worse, antisocial tendencies are liberated at the same time, and these increase the maladaptation. The alcoholic drinks to forget and thereby increases that which he would forget. This is the vicious circle.

Although not ordinarily put into such definite and technical terms, all sensible people realize this to be true. That is why we hear people say, "If he could only keep away from whisky for six months!" Even if only vaguely understood these facts should be sufficient to keep rational people from excessive drinking. But we know that this knowledge avails relatively little. Why does it not? The answer goes right to the root of the problem of alcoholism. With normal people reason triumphs over impulse, and they imbibe in moderation. The alcoholic is, before he ever touches a drop, an abnormal person. Sometimes—and here economic factors play an important rôle—the abnormality is environmental in origin. A man or woman with a human soul is forced to lead the life of a beast. In normal times the numbers who, through no fault of their own, are doomed to such a life are relatively small. The bestiality of their existence is more often of their own or their father's making. The chief problem is that of the man who is essentially psychopathic, whose unconscious gets out of leash and forces him, willy nilly, to produce a state of mental obfuscation in which he may indulge in thoughts or behaviour incompatible with his conscious standards. The normal man may experimentally get drunk once or twice, but as a rule is a temperate drinker. This is the crux of the therapeutic problem. If the etiology of alcoholism were simply alcohol, mere abstinence would cure the condition.

Attempts at social reform must inevitably follow the principle of trial and error. But if experiments are to be at all intelligent, we should have in advance some notion of the factors involved, even if their relative strengths be impossible to gauge without experiment. Further, if the trial prove an error one should have some idea of what has caused the failure. Our last topic is, then, to discuss whatever inferences may be drawn from the psychiatry of alcoholism that would bear on the problem of drinking in general.

The normal man is a psychiatric fiction. He does not exist. All of us, in varying degrees, have the same difficulties in meeting the world as the unfortunates who demonstrate their incapacity dramatically in psychoses. In a caricature we may see peculiarities we miss in a miniature. Then, turning to the latter, we can discern what we previously were blind to. This is the larger function of psychiatry. The psychopath commits a kind of mental suicide in order to evade responsibilities too great for him, and to translate himself to a world of fancy where reality does not mock his efforts. We "normals" drug ourselves with cheap fiction, theatres, and moving pictures; we go to sleep; we take vacations; we indulge in vicarious prowess and adventure in watching games and prize fights. Above all, we forget ourselves in social intercourse. But when a man is tired or oppressed with care how can he forget his obsessing anxieties or his self-consciousness sufficiently to become sociable? He can take a drink, and he does. If he be normal, a small amount of alcohol will give the necessary relaxation. Conviviality is more important for the maintenance of our mental stability and effectiveness than we realize, as is witnessed, if we stop to think, by the fate of those who utterly lack that capacity. The invariably cheerful and friendly person is never morose, sensitive, overbearing, a hopeless crank, or violently prejudiced.

It is because alcohol contributes to sociability that it holds the strong position it does among so many peoples. Let us compare its status with that of the narcotic drugs. In real emergencies the latter are infinitely more useful. As a noted physician said, "Without opium, no doctor would have the heart to practise medicine." As to the harm they do, the narcotics rarely, if ever, induce actual dementia, and, pitiful though the state of the individual addict may be, the mental aberration or degradation and the economic losses these drugs produce are statistically negligible compared with the ravages of alcohol. Yet society has placed its taboo on them. Public sentiment not only approves but demands laws regulating the traffic in these medicines. The differing psychological effects of alcohol and narcotics explain this difference in social attitude. Only abnormal people use the latter drugs, and their effect is, as a rule, merely to wipe out reality, not to release impulses a too stringent consciousness is on guard against. An opium den shows little trace of sodality. Innumerable people, on the other hand, are made happier, and therefore, healthier, by moderate indulgence in alcohol.

Prohibition enthusiasts are prone to claim that the abolition of alcohol as a beverage would cause no one any harm and prevent all the misery now laid at the door of inebriety. If alcohol did nothing for the drinker except harm him their claims would be justified. But their unsound reasoning does not prove that prohibition is undesirable. The question is, Would the gain be greater than the loss? No one, I fancy, is wise enough to answer this question; I certainly would not attempt to do so. I am here neither as a propagandist nor an antagonist, but as an agnostic trying to consider factors often neglected in discussion of the problem. As such I shall close with a few remarks as to the possible evil consequences of prohibition.

One must remember that we live in an imperfect world, imperfect largely because we have not yet gained the capacity to govern our own instincts. Alcohol is a crutch that man has discovered to help him with this disability. Some patients find they can walk and even run when their crutches are taken from them, but the majority need some artificial support. Let us first consider the fate of the psychopath who has been a potator and becomes abstemious. His brain becomes clearer, his mind works better, he saves money, and has a chance to gain that happiness in successful adaptation which will maintain him in equilibrium. In other words, he is brought back to that point in his career when he began to drink. If his inebriety was accidental or a response to some calamity the consequences of which are past, he is a saved man, but if not there is a tendency towards instability that will express itself somehow: in crime, in a psychosis, in character deterioration, or in social agitation that is pursued merely for the excitement it brings. I am reminded of two cases in this connexion. One was of a ne'er-do-well whom I persuaded to abandon drink. To my surprise he did so; also to my surprise a florid paranoid dementia praecox appeared in six weeks' time. The other man was a dipsomaniac recognized by critical associates to have brilliance to the point of true genius. Psychological treatment resulted in a disappearance of his periodic attacks, but he began to deteriorate morally. In a few months he had sunk to the level of a tramp. His history showed that antisocial tendencies had existed from boyhood on. To what extent had his dipsomania been a more or less harmless substitute for what was his ultimate fate? These, of course, are unusual and striking cases, but they remind one of the parable of the house that was swept and garnished; seven devils entered therein and the last state of that house was worse than the first. But parables are all—like my arguments—purposely one-sided. If effective prohibition were enforced "alcoholic" insanity would, of course, no longer appear. But one would have to watch statistics of crime and the constitutional psychoses before he could estimate how much drain on the public purse had been avoided.

For one inebriate there are at least a hundred people who drink in moderation. What would their fate be in an alcohol-free State? The changes would not be obvious, but they might be serious. True congeniality being under the new régime essential for lively social intercourse, society would be split up into smaller groups, and many individuals would become quite seclusive. Sectionalism is not healthy for society any more than solitude is for an individual. Then, too, a certain proportion of moderate drinkers crave and need excitement. As we are now dealing with a type that is moderately well adapted, we may presume that such people would not turn to flagrantly antisocial activities. But there would be grave danger of their indulging in that kind of political activity where the mere excitement of strife is an end in itself. As for the truly well-adapted folk, those who approach real normality, we can rest assured that abstinence would produce no untoward results at all. If one could estimate their numbers, one could answer, more or less offhand, the great question, Would prohibition be worth while?

Finally we must consider the problem of heredity. The experience of any physician shows that the alcoholic is not fecund nor do his progeny thrive. We do not need experiment nor statistics except to prove with exactness what we already know. But, if we are to look on this matter dispassionately, can we avoid the question, Is this good or bad? There can be no doubt that it is bad for society in any generation. The production of defective, badly nurtured and reared offspring inevitably throws a burden on society. But there is the race to consider. Eugenics exists in name only. If the true alcoholic be a psychopath is it well to let him reproduce? Assuredly not. What we ought to do is actively to prevent it, which sentimentality forbids. Alcohol eliminates the unfit. If we fail to treat the race with intelligent care should we prevent Nature from working her way, albeit it is blind, slow, and unkind?

DISCUSSION.

Dr. W. C. SULLIVAN (Superintendent Medical Officer, Broadmoor Asylum) said that the papers which had been read showed the sense of proportion and level judgement which were so necessary in dealing with this question. Most of the difficulties and differences of opinion were really due to exaggerations or partial truth, or the making of generalizations from isolated observations. With regard to alcohol in relation to mental disorder, on the one hand it had been asserted that alcoholic excess was almost always the consequence of mental disorder, and, on the other hand, that mental disorder was the consequence of alcoholic excess. Surely, if a sense of proportion were maintained, it would be realized that the cases of psychopathic inebriety were a mere drop in the alcoholic ocean; they were negligible by the side of those cases in which alcoholic excess was due to environmental and above all to industrial conditions. It was almost certainly unsound to suggest that alcoholic excess was an important cause of certifiable insanity—as unsound as it would be to suggest that general paralysis was the cause of kleptomania on the ground that most general paralytics were

addicted to thieving. It had also to be remembered that if a comparison was made of the regional incidence of alcoholism and of mental diseases as measured by admissions to asylums there was no such correspondence as one would expect to find. Finally, there was the evidence of the war years, which offered, he thought, quite convincing proof that for the most part alcoholism was a negligible factor in the causation of insanity. The speaker showed a table giving figures relating to alcoholism, attempted suicide, and insanity, amongst women only, in England and Wales, from 1913 to 1918 (the figures for men were not available).

	Convictions for Drunkenness.	Deaths from Alcoholism.	Deaths from Cirrhosis of Liver.	Attempted Suicide.	First Admissions to Mental Hospitals.
1913	35,675	719	1,625	983	9,372
1914	37,311	680	1,773	1,049	9,702
1915	33,211	584	1,525	816	9,078
1916	21,245	333	1,163	436	8,850
1917	12,307	222	803	452	8,702
1918	7,322	74	579	400	9,726

Under the system of physiological liquor control enforced by Lord D'Abernon there was considerable reduction in alcoholism in this country—in some cases a reduction of 70 per cent. But the admissions (of women) to asylums during the same period showed no decrease at all, but a slight increase. These figures were consistent only with the conclusion to be drawn from the pathological evidence of Sir Frederick Mott, that alcohol was a negligible factor in certifiable insanity. There were certain specific alcoholic forms of disease, but these, numerically quite small, exhausted the rôle of alcohol as a cause of insanity. To state it in a way that perhaps might appear absurd, the only insanity due to alcoholism was alcoholic insanity. But there were mental disorders, not reaching the level of certifiability, which were of great importance because they were a source of conduct disorders. Attempts at suicide represented a very common condition, and there was a large and, he thought, a convincing amount of clinical and statistical evidence to show that the attempt to commit suicide was ordinarily due to alcohol. That was very much what would be expected. There was no other agency of the same widespread character which so favoured the suicidal impulse and at the same time prevented its execution. It reminded him of a preacher on the west coast of Ireland who said to his congregation, "What makes you shoot at your landlords? The drink! And what makes you miss them? The drink!" In the case of crimes of violence and lust the conditions were more complex, and the same statistical movement could not be traced; but evidence was clear that murderous attacks on women by their husbands and the violation of children were more often due to alcohol than to any other cause. Alcohol, at least before the war, was an important cause of mental disorders, not amounting to certifiability, but leading to serious crime. Nowadays, under the partial operation of the policy which was introduced during the war, the alcohol problem was not nearly so important as previously.

In reply to the Rev. ADAM RENWICK (Penzance), who asked whether the war had not introduced causes which explained the increase in cases of insanity among women, Dr. SULLIVAN said that his statistics were merely returns of first admissions, but he believed it to be the general view that the war did not affect the female population in any direction likely to produce a considerable increase of insanity.

Captain ARTHUR ST. JOHN (Stirling) described the procedure adopted in the State mental hospital in Massachusetts in dealing with alcoholics. The régime was arranged, in the first place, to bring about the physical improvement of the patient; secondly, to cancel out if possible the particular cause of his inebriety; thirdly, to sustain his interest in the world of affairs, and return him to congenial occupation and environment; and, finally, to give him an extended educational treatment in the out-patient department, the work of which department was a great feature of the system. The percentage of improved cases under these conditions was 64. The people thus received were 80 per cent. voluntary cases, and the remainder were custodian cases, committed to the hospital by the magistrates on the certificates of two medical men.

(To be continued.)

THE SECTIONS.

BRIEF SUMMARY OF PROCEEDINGS.

ARRANGEMENTS have been made to publish full reports of the discussions in the Sections of the Annual Meeting at Glasgow during the next few months. Meanwhile, the brief notes of the first day's sessions which follow will enable those who were not present to gain a general view of the proceedings. Any errors to which attention may be drawn will be corrected in the full reports.

SECTION OF MEDICINE.

Wednesday, July 26th.

AFTER a few introductory remarks by the President, Professor T. K. Monro, Professor Hugh Maclean (London) opened the discussion on the prognosis and treatment of chronic renal disease. He began by pointing out that in recent years our conceptions of renal disease with regard to prognosis and treatment had become greatly altered; this was chiefly due to the information which was now obtainable as to the efficiency of the kidneys by the renal efficiency tests now employed. In dealing with chronic renal disease Professor Maclean explained that he recognized two main types—namely: (1) Hydraemic nephritis, in which there was very marked oedema, retention of chlorides and water, but no retention of nitrogen and no increase of urea. He pointed out that this type was really not a chronic form so much as a subacute form. (2) Chronic interstitial nephritis, in which there was very little retention of water or salt and no oedema, but there was a tendency for retention of nitrogenous products and a great tendency for cardio-vascular changes to occur. Professor Maclean said, however, that it was not unusual to get a mixture of the two types. Prognosis, Professor Maclean went on to say, should be based upon three main factors: (1) the general clinical condition of the patient, (2) the state of the cardio-vascular system, (3) the biochemical tests. In discussing these factors Professor Maclean emphasized that in his opinion the tests for renal efficiency were of greater value than the clinical symptoms, and instanced many cases in which symptoms had been entirely absent but the efficiency tests had given the clue to the condition present. As a general rule he relied most upon the estimation of the blood urea and the urea concentration tests as the most valuable and the most practicable. He reminded his hearers that one single blood urea test was seldom of value, as it might indicate only a temporary state. He also employed the diastase test, but regarded its value only as confirmatory. He did not consider that as a test by itself it was reliable. The state of the cardio-vascular system, Professor Maclean said, must not be overlooked, but he pointed out there were many instances in which the cardio-vascular system might be partly affected without much damage having been done to the kidneys. As regards treatment, Professor Maclean discussed mainly our new conceptions as to diet in chronic renal disease. He pointed out that in the hydraemic variety if there was no retention of nitrogenous products the indication was to give proteins in full amount and not withhold them as was formerly practised. In the severe cases, however, it was best to stick to the low protein diet. Decapsulation of the kidney promised good results for the future.

Dr. Comrie (Edinburgh), who followed in the discussion, agreed with Professor Maclean as to the value of the biochemical tests. He placed great reliance on the phenol-sulphonephthalein test, and held that a result of 50 per cent. indicated a good prognosis, and 30 per cent. and under must be regarded as indicating a bad prognosis. Dr. Symes (Bristol) confined his remarks to chronic parenchymatous nephritis, and pointed out that it was a bad name and one which he hoped to see disappear very soon. It was only a stage of diffuse nephritis, and not necessarily of so grave prognosis as the textbooks made out. He agreed with what Professor Maclean had said about the treatment of the condition, and urged also the value of iron and arsenic as drugs. Professor Shaw Dunn (Birmingham) dealt with the histology of the kidneys in chronic nephritis, and described the changes that occur as falling into two main classes—namely, alterative changes and destructive changes. He admitted, however, that most cases were a mixture of the two types. Dr. Katherine Robertson gave a description of six fatal cases which had been carefully considered clinically and at

necropsy. Dr. de Wesselow (London) pointed out that high blood pressure was not necessarily due to retention of toxic products, and instanced the polycystic kidney, in which there was no raised blood pressure in spite of high urea retention. He regarded the phosphates in the blood plasma and the calcium content in the serum as possibly important factors. Dr. Tidy (London) thought it was our duty to try to correlate more the clinical symptoms of the disease with the histology of the kidneys. He did not agree with former speakers that the histological types could be clearly divided into two classes. There were, he held, at least four types. He deplored that recognition had not been given during the discussion to the small white kidney. It was a definite clinical type with definite pathological changes. Dr. Toye (Birmingham) spoke of the value of the biochemical tests in general practice. Professor Monro (Glasgow) reminded the Section that the old-established methods of investigation must not be given up because of the undoubted value of the new tests. Professor Maclean, in replying, made clear some of the points of controversy which had arisen during the discussion. Over 150 members attended the opening session.

SECTION OF MICROBIOLOGY (INCLUDING BACTERIOLOGY).

Wednesday, July 26th.

Dr. Robert Buchanan, in opening this Section on July 26th, reviewed the development of bacteriological science and indicated the wide field to be covered by the programme.

Dr. F. d'Herelle, of the Pasteur Institute, opened the discussion on the bacteriophage. After stating the well-established fact that filtrates from organic material are capable of inducing lysis in bacterial cultures, he dealt with the possible explanations for this phenomenon and brought forward certain facts as proof of his contention that bacterial lysis is caused by the activity of a living ultra-microscopic parasite of bacteria, named by him the bacteriophage. He pointed out that the dissolution of bacteria under the influence of the bacteriophagic principle takes place in series and can be carried over from tube to tube; that the filtrable corpuscles multiply in the course of the bacteriolysis; that all bacteriophagic ultra-microscopic corpuscles, grown at the expense of any bacterial species, constitute one and the same antigen; that the ultra-microscopic corpuscles possess a variable virulence that by successive passages it is possible to raise the virulence of a feeble strain; that the bacteria defend themselves and are even capable of acquiring immunity towards the parasite; and that the bacteriophage is capable of adaptation. He declared his opinion that the phenomena described by him as due to a parasite were different from the lytic phenomena described by Twort in 1915.

Dr. F. W. Twort began by stating that the bacteriolysis described by d'Herelle could not be differentiated from the processes described by himself in 1915, and attributed at that time to an acute infectious disease of micrococci. He reviewed his earlier work on ultra-microscopic viruses, and pointed out in particular that lysis had been observed in sealed cultures of micrococci kept for a long time and apparently pure. In such cases the lytic agent seemed undoubtedly to have been produced by the bacteria themselves, for they had not come in contact with any external agent. Whereas, he declared, the possibility of the lytic agent being an ultra-microscopic virus had not yet been disproved, it seemed possible, but by no means certain, that the active transparent material found in cultures was produced by the micrococcus. He brought forward evidence derived from his recent researches to show that in a bacterial colony special forms might develop possessed of special functions, and that more stable and resistant types might be separated from an apparently homogenous culture. Such special forms of bacilli might be dissolved up for the benefit of the bacterial community, and the lytic agent might be formed for the purpose of carrying out this lytic action and setting free toxins contained in the special forms. Dr. André Gratia of Brussels was of the opinion that the Twort and d'Herelle phenomena were identical. He found no evidence of the existence of a living organism, but attributed the phenomenon to a chemical substance excreted by the bacteria themselves, his reason being the parallelism between the activity of bacterial growth and the production of the lytic agent, the similarity to chemical affinity as shown by the absorption of the lytic agent by dead bacilli, and the fact that lytic agents are antigenically specific. Dr. Ledingham expressed himself as unconvinced of the existence of any ultra-microscopic bacterial parasite, and appealed for a more exact study of the simpler processes of bacteriolysis. Dr. McLeod described experiments on the inhibition of bacterial growth by the products of bacterial metabolism. Dr. Fleming demonstrated the existence of rapid bacteriolysis caused by egg albumen and animal secretions, such as tears. Dr. A. W. M. Ellis reported on some quantitative experiments which lead to conclusions contrary to d'Herelle's hypothesis. Professor D. Ellis described a form of bacteriolysis of sulphur bacteria due to degeneration. In his reply Dr. Twort expressed himself as still convinced of the identity of the so-called Twort and d'Herelle phenomena, whereas Dr. d'Herelle brought forward fresh evidence of their dissimilarity, derived chiefly from the experiments recorded by Dr. Fleming.

A short summary was read of a paper by Dr. Wiseman on an outbreak of food poisoning by milk, caused by *B. aertrycke*, the first example of such a form of food poisoning yet reported. The source of the epidemic was not determined, but the author laid great stress on the fact that the stools of the patients affected were very watery and contained much mucus, a fact which served to favour a diagnosis of dysentery rather than the paratyphoid group infection. Dr. R. C. Robertson read a summary of a paper on "The toxins of *B. dysenteriae* Shiga," describing experiments in the detoxication of cultures of Shiga's bacillus. By means of a special technique he succeeded in preparing a non-irritating vaccine possessed of marked protective qualities. Sir William B. Leishman spoke highly of this research, and congratulated Dr. Robertson on his results.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

Wednesday, July 26th.

The President, Professor G. M. Robertson, in opening the proceedings on July 26th, deplored the separation of neurology and psychology, which was disastrous for both, and welcomed the combination of the Sections at the present meeting. Psychotherapy came to the fore during the war, the public taking a great interest in it, and the medical profession should express itself clearly on the subject. Psychotherapy was the oldest form of treatment—the methods of cure in the Bible were psychotherapy pure and simple; the successful medical man was the successful psychotherapeutist, though he might not know it. Dr. T. W. Mitchell (Hadlow) read a paper on "Psychotherapeutics and psychopathology," in which he traced the development and growth of psychotherapeutics from psychopathology, and claimed that psychotherapy not based on psychopathology could be little more than empiricism, and psychotherapy could only be fully developed when psychopathology was accepted as a necessary part of general pathology. The close relationship between mind and body was recognized in everyday life. The extent to which psychotherapy was of value in the treatment of organic and functional disease was only realized by those engaged in it. Many practitioners of psychotherapeutics had little knowledge of it before the war; in the war practically all cases were examples of neurosis, and as they have had very little opportunity of treating other types since the war their views are biased by war experience. In hypnotism and suggestion persuasion was largely adopted, and the appeal to reason; but for success explanation need not be true, though the patient must believe that it was. Clues to the origin and nature of illness were not within the patient's power of conscious recollection. In the treatment of war neurosis suggestion was often most unsatisfactory, and other means were required to restore health. Reassociation of dissociated memories, hypnosis to discover them, and suggestion as a means of restoring them were widely used. Suggestion in war cases by itself had no rational basis; mental conflict and repression together had accounted for many war neuroses. Psycho-analysis as a pathological and a therapeutic measure was considered, and the different standpoints of pathologist and therapeutist detailed.

Dr. J. A. Hadfield (London), in discussing "The making of a neurotic," said three phases were required: (1) the formation of complexes, (2) confliction of complexes, (3) the emergence of symptoms. Hereditary influences were at first considered of the greatest importance, but psycho-analysis and hypnotism had shown the influences to be in the main environmental; many conditions were handed down from parent to child by suggestion and imitation, not congenital in

reality, but due to influences of early environment. Environmental disturbances could be cured, and an hereditary cause should not be diagnosed until environment had been excluded; mental deficiency should, of course, be excluded. Psychoneurosis could not be inherited, but the soil might be transmitted; the nervous temperament was inherited, but was in itself not pathological. Instincts were psychophysical and inherited. Sentiments were those consonations which were acceptable to us—home, country, religion, etc. Organized together into "accepted self," will was the function of organized self. Complexes were consonations which were displeasing to us; they tended to become split off and were the cause and origin of psychoneurosis—fear, inferiority, and sex complexes. Most important were those which concerned self. Origin of all psychoneurosis was egotism—using the term in the widest sense—in some form. Psychoneurosis might date back to the third year of life, when self-consciousness was first developed; fantasies were then formed and became repressed, their occurrence was forgotten and only revealed by analysis. Failure to live up to a fantasy might cause a breakdown. Symptoms were not due to a single complex but to a conflict between two complexes. Biologist and psychologist looked at life from different aspects; a man broke down because he could not adapt himself to himself; a soldier broke down under shell fire because of the conflict between duty and fear. The conflict was endopsychic. Removal from environment was not sufficient to cure—recognition of the patient's change of attitude towards himself was essential, and in analysis both complexes must be traced.

Dr. Jane Suttie (Glasgow) read a paper on "The mental stresses of adjustment in women," which was highly appreciated. She said that certain stresses peculiar to women were commonly found in the neurotic: (1) The different maternal attitude to son and daughter. In present-day families girls were not valued as highly as boys, to the relative disparagement of girls. Childish jealousies produced the inferiority complex. Daughters were more influenced by the maternal preference. (2) Domestic skill had to be acquired by girls, but was not necessary for boys; the girlish virtues were repression, not expression, of self. (3) The contemplation of life from two sides—marriage or occupation—led directly to conflict. (4) The menopause exerted a variable influence depending on the previous mode of life. (5) Economic stress against biological instincts. Dr. H. Crichton Miller (London), in discussing the "Psychic and endocrine factors in functional disorders," began by saying that he used the phrase "functional disorder" in a purposely loose sense to avoid excluding a somatic etiological factor. All should aim at binocular vision, but the difficulties on both sides were serious; the psychic notoriously eluded scientific treatment. To an almost equal extent the endocrine factor baffled us. We could not ignore the evidence of universal human experience—the association of physical characteristics and mental traits. We should study in each case—(1) inherited endocrine pattern, (2) personal endocrine history, (3) personal emotional history. He suggested that the thyroid supplied the creative factor, the pituitary the imaginative "power urge," the adrenals the objective "power urge." From this could be framed a hypothesis of the various constituents of the human dynamic. Dr. C. F. Harford (London) regretted that there was no standard of medical psychology to go on; psychology was almost unformed. He referred to Dr. Rivers's lecture in Manchester on psychical determination. Students should believe in the law of causation; nothing is due to chance or accident, but the idea of psychical determinism does not interfere with some belief in free will. There were many points of controversy, but all should look for agreement. Three factors were common to all symptoms: (1) belief in the unconscious; (2) unconscious can only be reached through certain methods; (3) whatever the technique in the ultimate event, it must be acceptance of the individual, and the ultimate process is one of auto-suggestion. He appealed for study of the methods of Coué, and in association with Dr. Monier Williams he was at present testing his work and methods. Dr. Gordon (Bath) said there had not been much advance in psychotherapeutics during the last two years. Psychology and biology were not antagonistic, and all psychoneurosis was not due to sexual influences. The unit of any process corresponded to a reflex arc set in motion by a stimulus which might be a mental or biochemical change, and it was on these lines that psychopathology should be built up. Psychotherapeutists must work on a wide basis of physiology as a whole if progress was to be made. Dr. Murray Lyon (Edinburgh) said that hypnotism had been largely abandoned and suggestion was the main means of all treatment in one form or another; there was nothing new in what Coué said. Syphilitic neurotics were all potential tabetics or general paretics, but by suitable treatment the development of these diseases should be prevented. Insomnia, lightning pains, and ataxia of tabes had been controlled by suggestion. Dr. Connell (Edinburgh) agreed with Dr. Hadfield that every symptom was due to endopsychic conflict—sexual instinct was almost invariably involved as one factor. The environmental factor was of great importance. Dr. Calwell (Belfast) said that consciousness was of gradual evolution, and prenatal influences and forces acting in the first two or three years of life must not be neglected in discussing a causation of psychoses. Psychology was physiology of the higher centres. The influence of inheritance was very strong in disposition, tendency to thought, and mannerism. The influence of the state of the skin and muscles might be of importance as well as the condition of the endocrine glands. Dr. Helen Boyle (Brighton) thought Dr. Suttie had been unduly pessimistic about the outlook for women. Temperament played a very important part—"Give the child a start with no feeling of inferiority to her brothers, praise her for what she is good at, and she will do whatever she has to attempt well." Girls must know their limitation, whether submissive or aggressive; there was plenty of room in the world for all sorts. Dr. Smith (Peterhead) asked if there was any agreement in the profession as to whether the conscious or unconscious brain was the predominant part. The President said he was not disposed to answer Dr. Smith's question, and moved the following motion, which was carried unanimously:

> The members of the Section of Neurology and Psychological Medicine of the British Medical Association are of opinion that instruction in psychology and psychopathology (medical psychology) should form part of the curriculum of all medical students, and further, that this opinion should be brought to the notice of the General Medical Council and all the teaching bodies in the United Kingdom and Ireland.

He added that a course of lectures in psychology had been started in Edinburgh, and was being well attended.

Dr. Hadfield briefly replied to questions which had been raised on his paper.

SECTION OF GYNAECOLOGY AND OBSTETRICS.

Wednesday, July 26th.

The subject for discussion on July 26th was "Stillbirths and neo-natal deaths." In his introductory remarks the President (Professor Ewen J. Maclean of Cardiff) pointed out that the national importance of the subject only needed to be mentioned to be accorded. As fertility was the index of the present and the earnest of the future prosperity and strength of a nation, he thought that even the contraceptionists would approve of their objective, though it was anomalous from the national point of view that their propaganda should be allowed to proceed unhampered. He thought that so far as the population of the country was concerned the requirement might arise in the not distant future for the law to develop an ante-conceptional in addition to a post-conceptional application. In calling upon Dr. J. W. Ballantyne (Edinburgh) to open the discussion the President referred to him as "truly a pioneer of international status in ante-natal investigation." Dr. Ballantyne then read a paper on "Ante-natal, intra-natal, and neo-natal death: causes, pathology, and prevention, with special reference to ante-natal death." In opening, he remarked on the coincidence that in 1888, on the occasion of the last meeting of the Association in Glasgow, the discussion in this Section was also on ante-natal death, and he touched upon the limitations of the subject as they then existed. Dr. Ballantyne then proceeded to deal fully with the classification of the causes and the prevention of foetal death. He exhibited a most instructive table to illustrate how great a reduction in the stillbirth rate in Edinburgh had been brought about since ante-natal supervision and treatment had been practised. In conclusion, he urged strongly that every mother should be placed in the position to receive proper ante-natal care. Dr. Eardley Holland (London), in following, dealt more particularly with intra-natal death. He emphasized that examination of a large number of stillborn foetuses proved that a larger number died from the complications of labour than from foetal or maternal disease. *Post mortem*, these foetuses showed evidence of cerebral or visceral haemorrhages. It was remarkable how frequently the tentorium cerebelli was torn. He had found that in 88 per cent. of deaths of the child in

normal breech deliveries this condition was found. He urged that delivery of the after-coming head should not be unduly hastened. In conclusion he showed a series of lantern slides to demonstrate the lines of stress in the falx cerebri and the tentorium cerebelli to illustrate where tears were most likely to occur as the result of the moulding of the head. Professor Louise McIlroy (London) dealt with the subject from the point of view of the toxaemias of pregnancy. She confessed that her work so far had only made her feel more ignorant of the subject than when she commenced. She felt that the causes must be sought, not in the *post-mortem* room, but in the metabolism of the mother. Her view was that the chief causes of toxaemia came from the intestine—for instance, septic teeth, constipation, and so on. She enumerated the various lines of investigation she was following at present. She urged strongly that a commission of inquiry should be set up to go into the whole question thoroughly and to lay down the lines of investigation and give rules to be followed in ante-natal work. Professor A. M. Kennedy (Cardiff) was unfortunately unable to take part in the discussion owing to an attack of influenza. Further papers were contributed by Dr. F. J. Browne (Edinburgh), who also showed a very illuminating series of lantern slides showing the microscopic changes found in the various foetal organs and the placenta as the result of syphilis; by Dr. J. N. Cruickshank (Glasgow), who discussed "Syphilis as a cause of ante-natal death"; and by Dr. Gilbert Strachan (Cardiff) on "Placental changes in relation to foetal death." A discussion then ensued, in which Dr. T. W. Eden (London), Dr. Lapthorn Smith (London), Dr. Russell Andrews (London), Dr. Anderson (Glasgow), Professor Munro Kerr (Glasgow), Professor R. J. Johnstone (Belfast), Dr. Stewart (Glasgow), and the President took part. Dr. Ballantyne then briefly replied.

In the afternoon there was a demonstration in the Pathological Museum of specimens illustrating ante-natal and neo-natal pathology by Drs. J. N. Cruickshank and Hewitt (Glasgow) and syphilis in the newborn by Dr. F. J. Browne (Edinburgh).

SECTION OF PATHOLOGY.

Wednesday, July 26th.

THE President (Professor Robert Muir, F.R.S.) having welcomed the Section to Glasgow, Dr. J. A. Murray (Director, Imperial Cancer Research Fund, London) expressed the regret which all felt at the absence of Professor Fibiger of Copenhagen, who was prevented from coming to open the discussion in person. It was to Fibiger with his epoch-making experiments in the spiroptera cancer in rats that we owed the great advance that had since taken place in the particular aspect of research they were to consider that morning. During the war Japanese observers had claimed to have produced malignant tumours in rabbits by the long-continued application of coal tar; their evidence was not homogeneous, and it was fortunate that another Japanese worker, Tsutsin, repeated their experiments on mice and produced indubitably malignant tumours. The mouse was peculiarly suitable for such studies in that the duration of its life was about one-twentieth of that of the human subject, and one could elicit the whole story of malignant disease in that animal in a short period of time. Other laboratory animals were less satisfactory and more resistant to the process. Dr. Murray then discussed a single series of experiments with tar on mice. Using whole tar, alcoholic extract, and ether extract of tar, he found he got many more tumours with the last; and having applied simultaneously the three to different parts of the same animals he found that malignant tumours might result from any one of these, but not from the whole in any one animal, and he concluded that cancer, having once started in a single situation, conferred an "immunity" in the animal against the development of further primary malignant tumours elsewhere.

Dr. Archibald Leitch (Director of the Cancer Hospital Research Institute, London) then communicated for the first time to the Section the recent results he had obtained when endeavouring to establish on a broader basis the causal connexion of certain irritants with cancer. He pointed out that in certain industries, and in very striking instances, a specific substance had been implicated, and that the dispute seemed interminable between those who regarded such agents as a predisposing cause and those who maintained that such irritants were the proximate cause of the neoplastic response. He had endeavoured to apply the experimental method in these cases, and, while not claiming that the reply absolutely established a direct relationship, he maintained that it supplied considerable support to the theory of the irritant being the prime cause of tumour production. Apart from his tar experiments which had previously been communicated, he added two more successful cancer producers. Starting from the knowledge that cancer had been known for the last fifty years to occur in Scottish paraffin workers, he had applied for many months various distillation products of shale oil to the skin of large numbers of animals. The results, in mice in particular, were most interesting. In many of these animals, after a period of four months, wart formation took place, generally multiple, and these slowly gave place to true infiltrating malignant epitheliomata. In some instances, indeed, two or three independent epitheliomata developed in the same animal, and on one occasion he produced a spindle-celled sarcoma. Only one mouse in his whole series remained quite refractory to tumour production. Dr. Leitch then demonstrated an even more interesting series of experiments. Starting from the opinion of Jonathan Hutchinson that the long-continued use of medicinal arsenical preparations could induce skin cancer, he related the success which he and his colleague, Dr. E. L. Kennaway, had obtained by painting mice with a solution of arsenic one hundred times weaker than Fowler's solution. They had produced in addition to papilloma a rapidly growing epithelioma with metastases in the lungs. To the already known agents that produced cancer experimentally in animals—the *Spiroptera neoplastica* of Fibiger, the tar of Yamagiwa, and the *Cysticercus fasciolaris* of Curtis and Bullock—he thus had the honour of adding two more—namely, paraffin and arsenic. He had used and was still using many other suspected agents, and he believed that they would discover a large number of substances, in no way related chemically, which were capable of directly inducing neoplastic reactions. Dr. Alexander Scott (Broxburn) gave the results of twenty-two years' experience among the Scottish paraffin workers, a paper which was excellently illustrated with pictures of paraffin dermatoses and tumours. He had seen and carefully studied from the beginning the development of epitheliomata on the exposed parts of the workmen in 19 cases, and had traced the occurrence of 44 cases altogether amongst the employees. Roughly speaking, 5,000 workmen formed the population in which such cases occurred; and of these cutaneous cancers 63 per cent. occurred on the arms, which were directly exposed, and 30 per cent. on the scrotum, from the oil-sodden trousers. Multiple growths were not uncommon, even on the scrotum, and in most cases these were not metastases or recurrences but independent developments. The pre-tumour stage of dermatitis erythematosa took from ten to fifteen years for its development; the workmen who developed epitheliomata had been working in the paraffin sheds for twenty to forty years. This interesting communication from a medical man in general practice was recognized as being the result of a study of the conditions which was unique. Owing to the measures adopted now the disease was in a fair way of being completely abolished.

Dr. T. M. Legge, of the Home Office, spoke of the incidence of cancer formation amongst workmen engaged in the pitch and tar industries. He said that such epitheliomatous ulcerations were not notifiable by law and that certain regulations had been drawn up for these trades. Owing to the representations that had been made, industries using blast-furnace tar were excluded. He had never seen nor heard of epithelioma occurring in association with blast-furnace tar; and, in reply to a question, Dr. Leitch had stated that though he could easily and frequently induce tumours with ordinary gas tar, he had not succeeded in obtaining a single positive result with blast-furnace tar. During the last eighteen months 95 cases of epitheliomatous ulceration had occurred amongst workmen in the pitch, tar, and paraffin industries. But it was interesting to note that in the chrome industries, where severe and very chronic ulcerations were not infrequent, no case of epithelioma had ever been found.

Mr. Cecil Rowntree (London) communicated a paper on *x* ray cancer. He had traced all the cases that had been known to have occurred in England. In all these an *x*-ray burn had occurred at some time or other, and probably long-continued smaller doses were essential. It was curious that the disease was practically confined to the back of the hands, even the slender protection afforded by the sleeves being sufficient to exclude the kind of rays that produced epithelial changes. No case had occurred for a large number of years, and it was probable that owing to the precautions now universally

adopted no more cases would occur amongst *x*-ray workers. It did not follow that all who had an *x*-ray burn would develop epithelioma, as some radiographers who had met with such an accident as long back as eighteen years were still free of all suspicion of malignant changes. Dr. J. Cruickshank (Aberdeen) related some points that had impressed him in his experiments with tar. He had employed a sample of coal tar that was ten years old, and out of sixty-seven mice that formed the series in the experiment twenty developed malignant tumours. At least 50 per cent. of his tumours showed multiple sources of origin. Many were of a very chronic nature, and two showed lymphatic gland metastases. Both young and aged mice reacted similarly to the irritant. He was struck with the extreme degree of keratinization manifested, not only in the primary growth but in the metastases—a feature which was certainly uncommon in the skin cancers of man. He was of opinion that in most cases the tumours arose from the hair follicles, and not from the superficial epithelium, contrary to the opinions of Dr. Murray and Dr. Leitch, and in this way the multiple origin could be explained. Dr. Passey (London) stated that he had sought to obtain from soot an active tumour-producing fraction, and had found such a fraction by mixing the soot with lime and then extracting with ether. Applying such a fraction to mice he produced tumours in 50 per cent. of the animals in six months, warts beginning to appear at the tenth week. He took two series of mice, one fed on a diet deficient in fat-soluble vitamin, and the other on a ration rich in this vitamin, and applied the ether fraction to both. There was nothing to choose between them in results, both giving about 45 per cent. of tumours.

In the informal discussion that followed these very important papers Dr. A. J. Campbell and Dr. Hollins held that three things were essential for cancer formation—an abundant blood supply, a degenerated epithelium, and an irritant, the last causing the cells to revert to the germinal type. Dr. McKail related two cases of pitch cancer; and Colonel Mackie, I.M.S., spoke of betel-nut cancer in India.

SECTION OF PUBLIC HEALTH.

Wednesday, July 26th.

THE Public Health Section opened on Wednesday, July 26th in the Natural Philosophy Department of the University, with a rather meagre attendance, but numbers rapidly increased. The President of the Section, Dr. A. K. Chalmers (M.O.H. Glasgow), occupied the chair, and delivered the opening address, entitled "A plea for the study of biology in relation to public health." As an introduction to the subject he reviewed the more striking advances that had taken place in public health administration since the British Medical Association last met in Glasgow thirty-four years ago, and this comparison led him to ask whether the horizon had lifted so as to disclose objectives then hidden, and whether the same spirit which inspired our predecessors remained still with us. He thought a comparison of the records of the former meeting and of this would supply a sufficient answer; but in addition there was the testimony of the falling death rate, the diminution in severity of the infectious diseases, and the gradual extinction of the "plague" diseases. Legislation had advanced, barriers of prejudice had been broken down, and one field after another had been brought within the scope of regulated effort; but though each had played its part in the control of disease they were not the only factors. "Do we not," he asked, "too often forget that Nature is silently at work, often doing better for us than we know?" And on this he based his plea for a fuller study of Nature's method of adapting life to its varying conditions. In conclusion he exemplified the "new horizon" by reference to recent work in connexion with infant mortality, tuberculosis, and venereal disease, at the same time returning an effective answer to the trite criticism of preserving the unfit so often levelled at preventive medicine.

The first paper in the Section was one by Dr. R. J. Reece of the Ministry of Health, which traced the development of port sanitary administration from the early days when the authorities of Venice first drew up a code of quarantine regulations down to the present day. He was careful to point out that merely restrictive measures were insufficient to prevent the ingress of sea-borne diseases, that much depended upon the probity of the officers of the mercantile marine, and that it was also a necessary part of the scheme to see that the general sanitation of the vessels was brought up to a reasonable standard. In the discussion which followed Dr. Dearden (M.O.H. Port of Manchester) complained that too little was known by the general public of the value of this "first line of defence," and that the powers of the port medical officer were not yet sufficiently large to make his work so effective as it might be. Dr. King, who represented the Public Health Service of the United States, followed with an interesting comparison of their methods and ours, and referred to the difficulties which arose when there was a conflict between trade interests and health interests. Major Jackson, R.A.M.C. (ret.), gave his personal experience of the control of plague, cholera, yellow fever, small-pox, etc., in Indian ports, and the great difficulty of getting the natives to understand or observe the simplest rules of hygiene. Dr. J. C. McVail drew attention to the advantage of the American system, whereby immigrants came under expert observation at the place of embarkation; and Dr. Herbert Jones emphasized the usefulness of the slips sent by port medical officers to their inland colleagues intimating the destination of contacts from an infected ship.

The second paper was by Lieut.-Colonel Fremantle, M.P. (Consulting C.M.O. Herts), upon "The economics of public health," in which he endeavoured to show, in cash values, the loss occasioned by sickness, disablement, and death; and, *per contra*, what saving could be effected by the elimination of a disease such as tuberculosis. Upon conclusion of the paper Dr. Macfadyen gave a lively impetus to the discussion by declaring that the work in Glasgow, though admirable, had gone beyond the point which was economical. With this statement Dr. Herbert Jones absolutely disagreed. Too much was *not* being spent on the public health services. If the amounts were expressed in terms of rateable value it would be found that extraordinarily little was being spent as compared with, say, the upkeep of roads. Dr. Miller (C.M.O. Radnor) advocated as a measure of practical economy the reconstitution of sanitary districts and the avoidance of overlapping duties between county and district medical officers of health. The next paper was that of Dr. Brownlee (Director of Statistics, Medical Research Council), in which he discussed the interpretation of the death statistics of infancy and childhood in relation to development and environment, but, as Dr. J. C. McVail observed in thanking and congratulating the author, it was one to be read studiously and not discussed in summary fashion.

The final paper for the session dealt with puerperal mortality in Scotland, the author being Dr. T. F. Dewar, C.B., of the Scottish Board of Health. In a masterly fashion he showed that in this respect there had not been the improvement hoped for; in fact, recent figures did not compare at all favourably with those of former years. It was not his place, he said, to apportion blame, but merely to state the position as disclosed by the statistics he had compiled. A lively discussion followed, in which the "blame" was successively placed upon insanitary surroundings (Dr. Herbert Jones), the want of surgical technique (Dr. Shannon of the Glasgow Maternity Hospital), too much handling of the patient (Lieut.-Colonel Fremantle), too free use of instruments (Dr. Picken, M.O.H. Cardiff); but Dr. Morris (M.O.H. Neath) protested against blame being placed on the medical practitioner, though he admitted midwifery practice was in need of improvement, while Dr. Lewys Lloyd (C.M.O. Merioneth) also lodged a protest against the loose phrasing used in assigning blame to doctor or midwife. Nurse Barker (Inspector of Midwives, Glasgow) brought the discussion to a happy conclusion in laughter by describing how midwives often came to her *in tears* over the injuries done by doctors in trying to hustle nature.

SECTION OF SURGERY.

Wednesday, July 26th.

THE large surgery classroom was completely filled on the first day of the Section meetings. Professor Alexis Thomson presided, and was supported by the officers of the Section. In introducing the discussion on cholelithiasis Professor Rutherford Morison (Newcastle-on-Tyne) sketched the recent history of the surgery of gall-stone disease, with especial reference to his own part in it and to the evolution of the present-day opinions. In searching for the causation of the formation of gall stones, he now thought that infection of the gall bladder—the universally popular acceptation—was insufficiently supported by the evidence adduced in its favour. Until the cause of calculus formation everywhere in the body could be explained, probably by the chemists, doubts as to the etiology of those in the gall bladder must persist. Some predisposing causes were more common than others: repeated pregnancies, sedentary life, obesity,

all played a part. Clinically there were three types of stone—multiple small stones, medium (few or single), giant stones. In diagnosis only one subjective symptom was of importance—pain. This pain must have special characteristics—severe, sudden in onset, referred to epigastrium, catching the breath, and on cessation leaving the patient completely well. Great advance in diagnosis was not likely till *x* rays demonstrated gall stones in the bladder and ducts as they did in the urinary tract. There was only one reasonable form of treatment—namely, operation—a fact not even yet sufficiently realized. When the cystic duct was patulous cholecystotomy was the best operation; this he had advocated from the earliest days, and he still did so. If the gall bladder was seriously infected it should be opened freely, the stones removed, drained, and unless the gall bladder was so obviously pathological that recovery seemed impossible it should have the benefit of the doubt. If a second operation were called for it was found that the first had increased the natural peritoneal immunity to such an extent that the consequences of the second operation were of less importance. At present he was opposed to cholecystectomy as the operation of election, and his objections were founded on the consideration of gall-bladder function and the after-results in some cases. The ducts of the body possessed a protective mechanism of considerable value to the viscus which they drained. Removal of the gall bladder often resulted in dilatation of the common duct. This disturbed the protective mechanism of a duct opening into a potentially septic area—the duodenum—and might even give rise to a form of hepatic cirrhosis.

Mr. Farquhar Macrae (Glasgow) thought that infection and stasis were the two main contributory factors in gall stones. The mode of infection was in dispute; two factors were of importance: the bacteria required to be attenuated, probably in the passage through the liver, and infection could reach the wall of the gall bladder by its lymphatics. The element of stasis was largely supplied by the drag of a mobile ascending colon. In pregnancy it was possible that the increased cholesterol in the blood and the direct pressure upwards of the uterus were active agents, though repeated pregnancies might quite well increase the ptosis. Repeated attacks of cholecystitis had been cured by fixing up the colon in the method advocated by Mr. Waugh. Practically all cases of gall-stone disease were associated with very persistent flatulent dyspepsia, and even though colic did not occur gall stones or chronic cholecystitis were commonly present. In regard to operation he remarked that all cases of cholelithiasis do not demand operation, but if definite colic occurs operation may then be urged. He was not a whole-hearted advocate of routine removal of the gall bladder; so many and varied complications could follow that operation. He would like the general practitioners to narrate their experiences of the after-results of gall-bladder operations; so far as his inquiries went the family doctor did not prefer the complete removal of the bladder to the simpler procedure of drainage.

Mr. D. P. D. Wilkie (Edinburgh), in speaking on the question of diagnosis, thought that by the *x* rays gall stones could be demonstrated if the technique were rather different from that commonly employed, and that by the use of the duodenal tube the relaxation of the sphincter of Oddi and contraction of the gall bladder were accomplished and the problem of biliary sand and chronic cholangitis simplified. Gall-stone surgery was so difficult that it should be attempted only by men of experience, as, unless the surgeon were prepared to explore fully and deal with the varied and complicated conditions found, he should leave that class of case alone. Free exposure of the parts, with accurate assessment of the full extent of the pathological process and the adoption of methods adequate for this, were the two essentials. Beside these the question of removing or leaving the gall bladder was of secondary importance.

Mr. Archibald Young (Glasgow) thought that the introducer of the discussion should be prepared to advance some sort of more or less definite substitute for the bacterial theory in etiology. Nor did it appear that the diagnosis was quite so simple as he would wish them to accept. What was required was a coherent and consistent differential diagnosis. He advocated the Robson incision, which, if made large enough, gave adequate exposure, and if the patient were nursed in the bolt upright position gave efficient drainage. In regard to type of operation, each case must be judged on its merits. Mr. R. H. Parry (Glasgow) urged that gall-bladder cases should be sent to the surgeon after the first attack of colic, and in regard to the question of removal or drainage the answer depended on whether the infection were confined to the bladder or was one involving the ducts as well. Mr. Novis (Bombay), Mr. Mothersole (Bolton), Mr. Handfield Jones (London), Mr. Childe (Portsmouth), Dr. Arthur Jones (Mountain Ash), Mr. H. S. Souttar (London), Mr. Fletcher (Brighton), also contributed to the discussion, and Professor Rutherford Morison replied.

Professor Bull of Christiania followed with a most interesting paper on the operation of extrapleural thoracoplasty for pulmonary phthisis. He had a record of seventy-five cases, and his results justified the procedure. The indications for the operation were that the physician and surgeon working together should decide on the type of case suitable, that the operation should be performed only after failure of ordinary sanatorium treatment, including artificial pneumothorax repeatedly tried, and that the other lung should be, if not absolutely sound, nearly so. Details of the technique of the operation were given, and *x*-ray photographs and charts were exhibited on the screen. Perhaps the most interesting part of Professor Bull's contribution was the demonstration of the success of the operation on three patients who had come specially from Norway to Glasgow for the meeting. Sir William Macewen invited the Section to accord Professor Bull its heartiest thanks for his noteworthy paper and demonstration.

SECTION OF DERMATOLOGY.

Wednesday, July 26th.

AFTER the President had briefly welcomed the members, Dr. Cranston Low (Edinburgh) opened a discussion on seborrhoeic dermatitis. He first referred to the discussion on the same condition at the meeting of the British Medical Association held in Cheltenham in 1901. He said that the term "seborrhoea" should only be applied to the oily discharge of the sebaceous glands, which was often associated with increased sweating or hyperidrosis. Was this discharge due to hypertrophy or inflammation of the glands? Although bacilli were always present it was primarily an amicrobic process. Sometimes it occurred shortly after birth, and must then be acknowledged to be non-infective in origin; it was not common in childhood, but was frequent after puberty; several factors affected it. A carbohydrate diet was deleterious, as was also an excess of sugar in the food. Milk fats were worse than meat fats, because they raised the excretion of fats decomposable by bacteria. Alcohol, heat, woollen clothing, toxaemias of various kinds, and the endocrine glands were also factors which must be taken into account. On the other hand, according to Darier, "la kératose" was an anomaly of the skin and not a general disease at all, and this view was somewhat supported by Drs. Barber and Semon. Special forms of seborrhoea were: (1) true oily seborrhoea, which was always associated with acne; (2) seborrhoea capitis (*a*) sicca, (*b*) steatodes, with formation of crusts. He was unable to draw any clear opinion between the two: all conditions revealed the spore of Malassez. The connexion between seborrhoea capitis and ordinary baldness was interesting. Sabouraud connected baldness with seborrhoea oleosa, but it was more commonly associated with seborrhoea sicca. The lecturer discussed the causes of baldness, and suggested that it was much commoner in men because they wore the hair short; the wind blowing through the hair as it hung down the back was the normal stimulus to its growth. Seborrhoea corporis revealed the same organism as seborrhoea capitis, but whether it was the cause was very doubtful; the possibility of widely spread cases being due to sensitization to some protein must be considered. Some of the cases of extensive and resistant eruptions on eyebrows and beard occurring during the war might have been due to sensitization to protein or to the staphylococcus. He was inclined to think that in any case sensitization of some sort played an important part in the causation of seborrhoeic disorders.

Dr. Barber (London) said that he had been investigating the subject since 1917. Dr. MacCormac had pointed out that the seborrhoeic state was very common in the army. A distinction must be drawn between seborrhoeic dermatitis with secondary infection and eczematized impetigo. Most cases of severe mustard-gas dermatitis occurred in persons in the seborrhoeic state. These cases had gone on after the war but were now less numerous. Some of the patients had become seborrhoeic only while in the army, but others, the more severe, had been affected already while in civil life. It was difficult to define the seborrhoeic state. Excessive greasiness of the skin was a racial and familiar characteristic. There was also a pathological seborrhoeic state in which the secretion was altered as

well as increased. Alteration was the more important, for seborrhoeic dermatitis might occur in ichthyotic subjects. In acute cases there was increased acidity both of the secretions and of the urine. The resistance to the invasion of bacteria was diminished. The chief organisms were the *Staph. albus* and *aureus* and the acne bacillus, each of which produced characteristic eruptions. The best treatment was by means of autogenous vaccines. Large doses of alkalis were also recommended in less acute cases because of the diminished alkali reserve. He preferred to use this term rather than acidosis, which was used also for other conditions. The blood sugar, he found, was not as a rule much above normal, except when secondary pyogenic infections had occurred. It was highest in cases of sycosis barbae. The chief factors in the seborrhoeic state were: (1) faulty digestion, especially of carbohydrates, with consequent increase of acids; (2) hepatic insufficiency; (3) imperfect oxidation, lack of exercise, bad ventilation, and anaemia.

Dr. MacKenna (Liverpool) said that Dr. Barber and his colleagues were doing much to illumine an obscure subject; he did not think that the fact that acid was being eliminated proved that the alkali reserve was lowered, but he thought that Dr. Barber's later investigations had done so. He thought that the endocrine glands had something to do with every case of seborrhoeic dermatitis. He disagreed with Dr. Cranston Low as to the cause of baldness, but ascribed the earlier loss of hair in males than in females to differences in their endocrine glands. He uttered a word of caution against attaching too much importance to protein sensitization. Dr. Kenneth Wills (Bristol) desired to emphasize the infectivity of seborrhoeic dermatitis. He noticed that children who had seborrhoeic eczema were always associated with parent or nurses who had seborrhoea sicca of the scalp. He had seen striking instances of this in his practice. Dr. Douglas Heath (Birmingham) had also noted that large doses of alkalis improved acute seborrhoeic conditions. He also found that sulphur lotion was much improved in its action by being made up in an alkaline solution. He thought that olive oil, although a popular remedy, was highly deleterious in seborrhoea. Dr. Barber, on being recalled for his views on treatment, spoke in favour of autogenous vaccines, which he found extremely useful, notwithstanding the poor results which some dermatologists had reported from vaccine therapy. Dr. A. M. H. Gray (London) asked the meeting to define what was meant by seborrhoeic dermatitis and seborrhoeic eczema. He considered seborrhoea to be a mere excessive secretion of the glands, and he excluded conditions where there was any inflammation whatever. The term "seborrhoeic dermatitis" he applied to cases where there was some inflammation, most typically to the cases of circinate and figurate dermatitis in the centre of the chest and back. He refused to associate premature alopecia with the barber's shop and local infection, and in our present ignorance of the endocrine glands he preferred to stress the hereditary factor in these cases. Dr. Norman Walker (Edinburgh) held, on the contrary, that the local cause was responsible for the loss of hair. He believed in frequent washing of the scalp as a preventive of baldness. Moreover, he believed in the treatment of the scalp as the key of the treatment of seborrhoeic conditions, and above all, of rosacea. He also emphasized the importance of treating the oily seborrhoea of the scalp when dealing with acne vulgaris. Dr. O'Donovan (London) expressed gratitude to Dr. Cranston Low for his historical summary of the subject. He referred to the frequency of sugar excess in the blood in connexion with inveterate sycosis, but found that the exhibition of alkalis was of no therapeutic value. He had got the best results in such cases by painting them with liquid acid mercury nitrate. Dr. Murray (Glasgow) said that more treatment should be devoted to the scalps of children, and that seborrhoea of the scalp was often aggravated by working in watery solutions. Dr. Brown (Local Secretary of the Section) referred to two cases of his own in which gastric analysis had shown marked hyperacidity. Dr. Lancashire (Manchester), emphasizing the importance of preventive treatment, said that sulphur was best used as an ointment. He was disappointed with colloidal sulphur. Dr. Goodwin Tomkinson (Glasgow, Vice-President) referred to a case of seborrhoeic dermatitis associated with failure to pass an examination combined with a diet of sweetmeats.

The President then summed up the discussion. He said that the nature of seborrhoea remained obscure, but that Dr. Barber had started his researches on scientific lines. There were three possible lines of research: (1) clinical; (2) on the lines of comparative anatomy; (3) biochemical. The study of the glands in vertebrata revealed a correlation between keratosis and sebaceous activity. Probably the sebaceous glands were not purely fat glands but "moulting" glands. For the President seborrhoea signified alteration of the colour of the skin and cessation of the keratinization of the cell associated with loss of hair. When formation of keratin was exaggerated and a true exoskeleton was formed, as in reptiles, the sebaceous glands disappeared. So they did in birds, with the exception of the uropygial gland. On the biochemical side, he considered that the alkalinity of the tissues was an important point. All cutaneous inflammations were accompanied by acidity of urine because the exudation drained away the alkalis from the blood. He also considered relations of sugar to the blood important; probably the mischief was done by one of the di- or poly-saccharides as yet undiscovered. Dr. Cranston Low in his reply said that he still adhered to his opinion that men grew bald because they cut their hair short; he was disappointed with the result of the alkaline treatment of seborrhoeic conditions. Dr. Barber also replied.

After the discussion Dr. Lancashire read a short paper on "Dermatitis artefacta." He classified the disease into four types: (1) Hysterical subjects, who mutilate themselves with the idea of exciting pity and interest. (2) Those who appeared to suffer in order to please themselves and find a morbid satisfaction in the contemplation of their own infirmities. (3) Those who are victims of obsession and sudden uncontrollable impulse. (4) Those who practise the production of these lesions as a habit, comparable with nail biting. In treating these cases he, unlike many of his colleagues, found that the best course was to tell the patient that she had been found out.

SECTION OF DISEASES OF CHILDREN.

Wednesday, July 26th.

IN opening the joint discussion with the Section of Physiology on the etiology of rickets, Dr. Leonard Findlay reminded his hearers of the work done on rickets by physiologists and clinicians, work in which Glasgow graduates had taken a large share. While not belittling the achievements of physiologists he thought the final battle as to the etiology of human rickets must be fought out in the clinical field. It was necessary to see how far theories of pathogenesis stood the test of clinical experience. Rickets had a definite geographical distribution and seasonal incidence. It was also, except in India, a disease of the poor. These facts must be reconciled with any theory of its origin. In his investigations into rickets Dr. Findlay had met with several perplexing facts. For instance, one child might be actively running about and yet *x*-ray examination showed a severe degree of deficient calcification at the growing ends of the long bones. In another case, ostensibly in consequence of some therapeutic measure, the bones showed signs of healing but the child remained helpless and disinclined to walk. This raised the question as to whether rickets was a disease which might implicate any part of the body or whether bone changes were necessarily always present. The dietetic theory of rickets was at present the most popular. Clinically the diets might be divided into three groups: prophylactic, provocative, and curative. The addition of cod-liver oil to the diet appeared to have a prophylactic effect in some cases but not in all. Certainly children brought up on diet deficient in fat did not necessarily develop rickets. The recent work of Hutchison in India made it difficult to understand how diet could be an important factor. As regards the curative effects of cod-liver oil Dr. Helen Mackay's work showed that no improvement followed addition of fats to the diet except during the summer months. If the absence of fat-soluble A were the cause of rickets keratomalacia should be seen in many cases, but in point of fact it was very rare. Environment and general hygiene had always seemed to be factors of importance. Dr. Findlay himself was inclined to lay stress on the absence of exercise. Sunlight had a curative effect, but in the cases ascribed to lack of sunlight lack of exercise had also been present. In Iceland rickets did not occur, although there was no sun for four months in the year. Dr. Findlay concluded that rickets was not a deficiency disease. He thought it was somehow associated with confinement, but suggested that in both experimental and clinical fields the idea of rickets being an infection should be more seriously entertained and investigations undertaken with this idea in view.

Professor Mellanby (Sheffield) considered rickets as a disease accompanying growth, and due primarily to defective feeding.

A rickets-producing diet was one that contained too little of those foodstuffs responsible for proper calcification of bone, and too much of those substances responsible for the growth of tissue. In diets containing a sufficiency of calcium and phosphorus the most potent influence for procuring the calcification of bone was a vitamin having distribution and properties similar to fat-soluble A. The essential factors of a diet were interdependent, and it was no longer possible to speak of excess or deficiency in an absolute way. The amount of fat-soluble vitamin which might be sufficient in one diet might become relatively deficient if more cereal were added. Similarly, calcium might become inadequate if excess of butter or cod-liver oil were given. In his experience rickets never developed on a good diet however bad the environment, and a really bad diet would result in rickets in the most perfect surroundings. He then discussed the interaction of fat-soluble vitamin, calcium, and phosphorus, and the relation of the experiments performed on rats by various investigators to his own work on dogs. With regard to cereals, he maintained that the severity of rickets produced by a deficiency of vitamin depended, if other things were constant, on the amount of carbohydrate ratio—the more carbohydrate consumed the worse the rickets. Adding more cereal to a diet already adequate caused young animals to increase in weight from deposit of fat in the tissues and to become lethargic. Addition of fat, on the contrary, stimulated metabolism. The fat was not deposited in the tissues. It was burnt, and the animal became more lively and took more exercise. It was probable that a child's activity depended on its diet, not on its environment. It was therefore not lack of exercise but the unsuitable feeding which produced lethargy in the child and caused rickets. Dr. Mellanby agreed with other workers as to the therapeutic effects of sunlight. He thought they might be explained by chemical changes in the skin whereby vitamin was liberated into the circulation. He was of opinion, however, that sunlight was of secondary importance and would only prevent rickets in cases that were receiving a mediocre "borderline" diet.

Dr. Robert Hutchison (London) said that he could only speak of rickets as a clinician. He was seeking the truth, which in this case appeared to be hidden very deeply at the bottom of a well. As regards the cure of rickets, clinicians had always succeeded in curing the majority of cases. Thirty years ago Dr. Cheadle had insisted on the importance of hygiene in rickets. The speaker agreed with Professor Mellanby that the dietetic factor could not be left out of account. If cures could not be obtained by altering the diet when other conditions remained the same, then work in hospital out-patient departments would be futile. Clinicians had long recognized that deficiency of fat and protein and relative excess of carbohydrates were important factors. He thought that adding oatmeal to the diet was of advantage in rickety children. There was, however, evidently another factor in the causation of rickets of which at present we were ignorant. He thought that rickets was a metabolic disease and not a microbic infection. Workers should concentrate on the study of metabolism in rickets, as was being done by Professor Paton and his associates. Professor Noël Paton (Glasgow) said that from the practical point of view there was no evidence of the existence of any antirachitic agent in butter and milk fat. Professor Mellanby had produced rickets in dogs on a diet of separated milk, but other factors were really involved, such as low calcium and low fat intake. The difficulty was that rickets so often underwent spontaneous improvement. He could not find any evidence that it was cured by butter. His experiments on puppies showed that those kept in the country on separated milk were free from rickets, whereas those kept in the laboratory on whole milk contracted the disease. Cod-liver oil had a curative action, but so had other agents, such as sunlight, ultra-violet rays, and fasting, and many cases were self-cured. Rickets in pigs cleared up when the salt content in the diet was altered. He had tested the infective theory by inoculation of blood and feeding with faeces, but with negative result. He concluded that we knew little more about the cause of rickets than Glisson or Soranus. He thought that workers should co-operate, avoid theories, and get to work on facts. Professor Korenckevsky (London) said that the results of his experiments agreed with those of Professor Mellanby. Deficiency of fat-soluble A might produce either rickets or osteoporosis. The action of vitamin A on the skeleton was the result of several factors, only some of which were known at present. First, it had the property of conducing to the normal deposition of lime salts in bone. Secondly, it was necessary to growth and normal nutrition of tissues. Thirdly, it had the power of inducing a normal state of appetite. Different individuals resisted the bad effects of deprivation of vitamin A in different degrees. The state of nutrition of the mother during pregnancy and lactation was a most important factor in the skeletal development of the offspring. Dr. J. B. Douglas Galbraith (Glasgow) gave the results of a clinical investigation carried out in different groups of children whose diets were carefully controlled. Some children were fed on a diet rich in fat, others on a diet deficient in fat, others were breast-fed. During the winter a large percentage of the children in each group developed rickets, but the percentage was slightly higher in the group on the diet rich in fats, and this group also had the disease rather more severely. Very few children developed rickets during summer. Cod-liver oil was not given, milk fat being used in all cases.

Dr. J. Sim Wallace (London) read a paper on the association of dental hypoplasia and rickets. Those well acquainted with the facts did not believe in the vitamin theory as regards teeth. The enamel was developed long before the eruption of the teeth. In feeding experiments the hypoplasia, which was thought to have been caused by the absence of vitamin, must have existed two or three months before the special feeding was begun. In rickety children there was no defect of enamel as a rule, and caries was not more frequent in them than in others. The only connexion between rickets and caries lay in the fact that excess of carbohydrates caused both. Dr. H. S. Hutchison (India) gave the result of his observations on dental caries in the Nasik district in India. Dental caries was rare among the natives, but its incidence was the same in all classes. Rickets, on the other hand, was six times as common in the upper classes, where purdah was the rule. He did not agree with Dr. Mellanby as regards the activity of children being due to fat in the diet. The children of the poorer classes in India who received scarcely any fat were extremely active. Dr. J. B. Orr (St. Andrews) limited his remarks to one aspect of the dietary factor in rickets—namely, the mineral content of the food. The requirements of individual species varied, the ideal proportion of minerals for each species being that found in the milk. The utilization of minerals depended on the form in which they were present in the food and their relative proportions. He had repeated Dr. Mellanby's experiments on pigs and had confirmed his results; but when he had adjusted the mineral ratio to the requirements of the animals no rickets developed, although the other factors in the diet remained the same. Dr. W. E. Elliot, M.P. (Glasgow), laid a special stress on the disturbance of balance in the diet in rickets. The mineral content was extremely important. The dietetic facts had not been as yet thoroughly investigated. It was impossible to dogmatize until they were known. Dr. Leonard Findlay replied.

SECTION OF INDUSTRIAL DISEASES AND FORENSIC MEDICINE.

Wednesday, July 26th.

PROFESSOR GLAISTER, President of the Section, in his opening address (published in full in last week's JOURNAL, p. 165) referred to the conjunction of the subjects of forensic medicine and industrial diseases in one Section and pointed out that hitherto forensic medicine had been considered chiefly from the standpoint of criminal law. From time to time the question had been openly discussed. Whether the time had now arrived for the inclusion under one group-subject of all matters which involve the application of the science of medicine to the purposes of law, such as National Health Insurance, the Compensation and Employers' Liability Acts, and those portions of public health law briefly comprised under the headings of nuisances, unsound food, and others relating to medical knowledge as applied to the law, with the title of State medicine. He was of the opinion that the time was not yet ripe for such general inclusion. The remainder of the paper was devoted to the subject of industrial diseases and compensation considered retrospectively and prospectively, including the advisability of establishing a State system of accident insurance. Professor Allison read a paper on the importance of teaching medical jurisprudence to students of medicine and law. The necessity was emphasized by the medical jurist viewing disease, accident, and death from the legal as well as the clinical standpoint, and the need for acquaintance with medical matters on the part of lawyers pointed out. A plea was made for more frequent

post-mortem examinations where the cause of death was doubtful, even though lay evidence pointing to violence was not present. Suggestions were made for more thorough teaching of the subject to students, and it was specially urged that wherever possible they should be brought into more intimate contact with actual cases.

In the discussion which followed the address Sir W. H. Willcox agreed that more attention should be devoted to forensic medicine during the student's curriculum, and also entered a plea for more frequent *post-mortem* examinations. Mr. J. D. Strathern, Procurator-Fiscal for Lanarkshire, was of opinion that medical jurisprudence should be a compulsory subject for examination for all law students, and advocated the desirability of more frequest discussion of medico-legal subjects by lawyers and doctors. Dr. Godfrey Carter (Sheffield) advocated that in all large cities having a medical school the work of police surgeon should be delegated to the person holding the lectureship in forensic medicine. The President and Sir Thomas Oliver also took part in the discussion.

Sir W. H. Willcox read a paper on the dangers to health produced by the use of industrial preparations of arsenic. He enumerated the commoner preparations used, and showed how these might result in poisoning of an accidental, suicidal, or homicidal type. He pointed out that there had been a large increase in the number of cases of poisoning from industrial preparations of arsenic since restrictions with regard to the sale of certain arsenical preparations of arsenic were relaxed in 1908. Illustrative cases of accidental poisoning were adduced and some recent trials for murder referred to.

Sir Thomas Oliver and Professor Glaister, who took part in the discussion, agreed with Sir William on the urgent need for further restrictions on the sale of preparations of arsenic. The Section then passed the following resolution:

> The sale of arsenical preparations included under Section 2 of the 1908 Act should be limited (1) on the part of the seller to properly qualified and competent persons—namely, to registered pharmacists; and (2) on the part of the purchaser to those who have obtained a licence for the possession of such dangerous articles.

SECTION OF PHYSIOLOGY.

Wednesday, July 26th.

On Wednesday morning, July 26th, this Section (as recorded elsewhere) held a joint session with the Section of Diseases of Children for an important discussion on rickets.

In the afternoon a demonstration on rickets was given in the Physiological Institute. A large number of specimens illustrative of various aspects of the disease as occurring both in the human subject and in animals were on view. The chief exhibits were: (1) Experimental rickets (Mr. A. Watson and Professor D. Noël Paton). *X*-ray photographs and actual bones of normal and of rachitic puppies. Influence of various experimental conditions, chiefly dietetic. (2) Experimental rickets (Professor V. Korenchevsky). A fine series of microscopic specimens of rachitic changes in the bones of rats—mostly due to a diet deficient in vitamin. (3) Rickets in India (Dr. H. S. Hutchison and Dr. G. Stapleton). A most interesting series of photographs and skiagrams illustrating housing conditions and early and late cases of rickets amongst the native population. (4) Clinical rickets (Dr. J. B. Douglas Galbraith). Skiagrams and photographs showing the progress and cure of the disease in children.

RADIOLOGY AND ELECTROLOGY.

Wednesday, July 26th.

Dr. L. A. Rowden, the President of the Section, opened the proceedings with a brief address of welcome. He prophesied an increasingly important place for radiology in the treatment of disease in the future, although, on account of the very high initial and continuing cost of apparatus, it might be that the private radiologist and electrologist would have to give way to some form of institutional provision. Dr. J. R. Riddell (Glasgow) opened a discussion on the treatment of malignant disease by the Erlangen method of deep *x* ray therapy. He recounted a very large number of cases treated by this method, with results less favourable than those reported from Germany, but still with a high average of success. In 30 per cent. of the cases all evidence of the disease had disappeared, and in 52 per cent. the benefits secured were very great in the form of relief of pain and discomfort. Dr. Douglas Webster (Middlesex Hospital) also read a paper on the subject. The whole matter, he said, was one in which sure conclusions as yet were difficult to arrive at. A series of notable advances in *x*-ray instrumentation and in methods of quantitative measurement of depth radiation were being made, and these must in a short time result in a great increase in the knowledge of the subject. He was sure that some of the beneficial effects he had seen could not have been obtained with any other method of treatment. Dr. F. Hernaman-Johnson drew attention to some principles which were in danger of being overlooked. Cancer treatment must always be considered, not only in relation to the malignant cells, but to the surrounding tissues and to the general state of the patient. Too much attention was apt to be paid to the single large dose—the "knock-out blow"—and not enough to the series of small doses which would often give relief for years. A number of questions were put to the readers of the papers by Dr. J. Mitchell, Dr. Gibson Graham, the President, and others. Dr. Woodburn Morison (Manchester) then read a short paper dealing with the differential diagnosis of diseases of the diaphragm, and showed *x*-ray views of a number of cases. Dr. F. Hernaman-Johnson opened a discussion on gas inflation as an aid to *x* ray diagnosis. He described the uses of peritoneal inflation, the risks of the method, and the importance of careful technique, and then turned to the subject of perirenal inflation, the method introduced by Dr. Carelli of Buenos Aires. The advantage of being able to show the complete kidney outline, together with that of the suprarenal capsule, was obvious. It would often in itself clear up a doubtful diagnosis, and when combined, as Carelli suggested, with gas inflation of the ureters and pelvis, left little to be desired in the way of *x*-ray demonstration. Recently, in conjunction with Dr. Ernest Young, the opener of the discussion had made some experiments upon inflating the stomach and duodenum through a fine duodenal tube. So far as the duodenum was concerned, the gas appeared to distribute itself too quickly into the small intestine to permit of useful outlining. The value of stomach inflation was that, when combined with peritoneal inflation, it enabled comparatively small changes in thickness in the anterior wall of the stomach to be recognized. Dr. J. M. Redding (London) laid stress upon the need for careful selection of cases in the method of injection of gas into the peritoneal cavity. In such selected cases the method would furnish information not to be obtained by any other means short of an exploratory laparotomy. Dr. Hernaman-Johnson, in reply to the President and others, said that he regarded CO_2 as more desirable than oxygen; the only disadvantage of CO_2 was that the pictures must be taken very quickly.

SECTION OF ANAESTHETICS.

Wednesday, July 26th.

A well-attended meeting of the Section of Anaesthetics was held in the University Buildings on Wednesday, July 26th. The President, Dr. McCardie, in his opening address, after referring to the honour done him by choosing him as president of the Section and thanking Dr. Fairlie, the local honorary secretary, for the admirable arrangements made for the meeting, stated that he was led to believe that the official training of Glasgow medical students in the administration of anaesthetics was still in the hands of surgeons. This practice was in the best interests neither of the students nor of the patients. It was impossible for surgeons engrossed in the ever-widening field of their own activities to keep abreast of advances in the rapidly developing art of anaesthesia, much less to teach such developments. The life of a patient often depended not only on the choice of an anaesthetic but also on its method of administration. His fellow workers in Glasgow and other parts of Scotland had taken a full share in these developments, and he ventured to prophesy that this first meeting of the Section of Anaesthetics to be held in Scotland would be the precursor of many other meetings in her cities. Dr. David Lamb (Glasgow) then read his paper on "Bronchopulmonary complications following operations under anaesthesia." Whilst all Glasgow anaesthetists used ether freely, as well as chloroform, in their work, the students were still taught that whilst a few deaths occurred on the table from chloroform, far more occurred after the operation from pulmonary troubles and heart failure when ether was used. The number of fatalities occurring annually in this city from chloroform in the hands of comparatively inexperienced anaesthetists would probable surprise, if not startle, the adherents of this old doctrine. In regard to the *frequency* of

these complications, statistics were of little value unless based upon careful personal observation of all cases, and unless discriminating between clean and septic cases and between those beginning in the first twenty-four or forty-eight hours after operation and those occurring later on. The latter were almost always associated with sepsis. The most important contributory factor in the causation of broncho-pulmonary complication was the presence of more or less recent catarrhal affections of the upper air passages of the patient prior to the operation. Next in importance was exposure to chill before, during, or after operation, though there were other contributory factors, including aspiration of infective organisms from the mouth and throat ("aspiration" pneumonias). The later pulmonary affections were practically all septic in origin. With regard to the part played by the anaesthetic, opinion in this country and abroad varied considerably, but the general consensus of opinion was that prolonged administration alone (more especially of concentrated vapour of ether) gave rise, by direct irritation or by chilling due to evaporation, to any real danger. The vapour of ether, and of chloroform to a very much less degree, was an irritant to the lining membrane of the upper air passages and bronchi, but unless unskilfully administered hardly ever enough to set up a purely irritant bronchitis or bronchopneumonia like that caused by poison gases during the war. But where the resistance of those tissues was weakened by chill or lowered vitality, or the presence of a mild catarrhal condition, or both together, this comparatively mild irritant action, more especially of ether, might act as the "last straw." For prevention Dr. Lamb advocated the employment of expert anaesthetists, who would be more likely to avoid the use of a too concentrated vapour and the administration of ether in cases in which its use, prolonged or otherwise, was contraindicated. He also advised preliminary administration of atropine and avoidance of ether in "catarrhal" cases, lateral position of head when possible after operation, especially in mouth cases, to prevent aspiration troubles, avoidance of tight bandaging in heart and abdominal cases, and washing out the stomach prior to operations in "obstruction" cases.

The paper gave rise to an interesting discussion in which the following took part: Dr. Dickinson Berry (London), Dr. Flemming (Bristol), Dr. Paton Boyd (Glasgow), Mr. Herbert Paterson (London), Dr. Featherstone (Birmingham), Dr. Pinson (Manchester), Dr. Johnson (Aberdeen), Dr. Pinto-Leite (London), Dr. Fairlie (Glasgow), Dr. Barras (Glasgow), and Dr. Adams (Birmingham). The discussion was wound up by the President, who reviewed the various remarks made by the speakers, and commented upon them and upon the excellent paper contributed by Dr. Adams. On the invitation of the President, the members of the Section then met together at lunch in the Students' Union. A less formal meeting followed at which Dr. Flemming (Bristol) read his paper on "Different effects produced by exposing tissues to various concentrations of anaesthetic vapour," followed by a demonstration of these effects, illustrated by the microscope, photographs, and living plants. Subsequently Dr. Featherstone demonstrated his new airway, and Dr. Pinson his "bomb" apparatus for the adminstration of ether vapour.

SECTION OF ANATOMY.

Friday, July 28th.

THE PRESIDENT, Professor Alexander Macphail (London), said that the British Medical Association had always identified itself with scientific work, and had included anatomy in its list of subjects for discussion whenever possible. He emphasized the value of anatomy to those in practice or working in other scientific fields. On the other hand, anatomists derived great benefit by contact with the practising profession. He wished to pay a tribute to the man who was his teacher in this University and under whom he had been senior demonstrator. Professor Cleland was a giant both in intellect and stature. He thought he would be interpreting the wishes of the Section if he asked the secretaries to transmit to Professor Cleland a message expressing the esteem, high regard, and affection which they felt towards him. Professor Macphail then went on to discuss the administration of the Anatomy Act, and the measures he had taken to obtain sufficient anatomical material for teaching. Only unclaimed bodies were asked for, and he deprecated any attempt to bring about any form of compulsion in the disposal of bodies. He thought that when those in charge of unclaimed bodies understood what they were wanted for no difficulty would be found in obtaining sufficient material. Professor J. C. Brash (Birmingham), discussing the relation of the ureters to the vagina, explained his method of dissection, which preserved this relation and also marked out the trigone in relation to the vagina. In the course of this work he had discovered several interesting facts. The relation of the last portion of the ureter to the vagina was variable. There was usually a portion of the ureter in front of the vagina lying for a short distance in the connective tissue between the vagina and bladder and then in the wall of the bladder itself. The vagina and bladder were usually not symmetrically related to each other. The result was an increase of this portion of the ureter on one side and a corresponding decrease on the other. In the majority of specimens examined the left ureter had the closer relation to the vagina and was occasionally found crossing the middle line of the vagina; it was therefore in a position of greater danger than the right. He explained the asymmetry of the uterus as due to pressure from coils of intestine distended with meconium during the latter part of intrauterine life.

Dr. Alfred Piney (Birmingham) discussed the naked-eye anatomy of the bone marrow with age changes, and gave the results of examination of the bone marrow in 1,700 necropsies. Dr. J. M. Woodburn Morison described the teaching of anatomy by radiology in the anatomy department in Manchester, and outlined his scheme of radiological demonstrations to anatomy students. He explained how the structure and growth of bones, the development of epiphyses, and the movements of the heart and intestines could be studied by this method. Research students were also enabled to use the *x*-ray apparatus for their work.

In his paper on the structures of the vertebrate head Dr. W. B. Primrose set out to show that the structure of the vertebrate head was based upon the first metameric segment of the body with which was combined an unsegmented structure, the face. Four different skeletons appeared during development, but although morphologically distinct they were not separable anatomically. They were: (1) The sclerotome skeleton, which was first formed at a time when the somatic or body wall mesoderm became segmented for the purpose of acting upon the segmented hydrostatic or water skeleton contained in the coelomic sacs of the Annelida. The hydrostatic skeleton disappeared, but the septa separating the coelomic compartments remained to give attachment to the segmented body wall muscles and, in fishes, became the sclerotomes. From the sclerotomes were developed two sets of arches, the neural and the visceral. In the head the sclerotome skeleton was represented by one neural arch—the occipital, and one visceral arch—the hyoid. (2) The axial skeleton, which was developed from the notochord. It formed the basi-sphenoid and the basi-occipital. (3) The splanchnic skeleton, which appeared when chordate animals evolved special respiratory organs. It was represented by the gill bars in fishes and the laryngeal, tracheal, and bronchial cartilages in pulmoniferous animals. In man it also formed the greater cornu of the hyoid. (4) The facial skeleton, which was evolved in connexion with the organs of special sense, with a supplement in the form of membrane bone to support the face. The existence of this skeleton was determined by the ectoderm in the form of sense organs, brain, teeth, and general skin covering, and as none of these structures was segmented, neither was the skeleton which supported them. The author then explained the relation of the myotome, somatopleure, segmental blood vessels, gut derivations, and ectoderm (with special regard to the cranial nerves) to the head segment and traced the development of each. A simple metameric segment was the morphological basis of the vertebrate head, but a condition of extreme specialization had been reached during evolution.

Dr. W. K. Connell's paper on the form of the palate in childhood was based on the impression taken in plasticine of the upper dental arcade in over a thousand children. The variations in shape of the arch were studied in normal and pathological states, as also the alterations which took place during growth and the relation of the size of the arch to the state of general development of the child. Nine principal shapes were found in normal children. Curiously enough, in children with adenoids no narrowing of the arch had been found. During growth the palate became actually narrower from 12 to 14. No relation had been found between size of palate and size and state of development of the child. Dr. John T. Hunter (Sydney), in discussing intestinal diverticulum with retroposition of the

transverse colon, showed drawings of the viscera of a child seven days old who had a large cyst in the mesentery. The cyst was attributed to the closing off of a diverticulum arising in the duodenum during development. The abnormal position of the colon was explained by the fact that the proximal part of the gut was bound down by the cyst and could not assume its proper position during development.

SECTION OF LARYNGOLOGY.

Thursday, July 27th.

THE discussion on the symptoms of oesophageal disease and their differential diagnosis was opened by Dr. D. R. Paterson (Cardiff) and Mr. W. G. Howarth (London). Dr. Paterson gave a survey of the symptoms connected with the more common affections of the upper opening of the oesophagus, whilst Mr. Howarth dealt mainly with the lower half of the oesophagus. The recent methods of diagnosis were described, the technique of using the fluoroscopic screen being dealt with in detail. Dr. Brown Kelly (Glasgow), in discussing these papers, described in detail his observations on cardiospasm and achalasia. Dr. William Hill (London) described primary spasm as an extra-metropolitan disease, never seen in London. He described his observations and experiments on the physiology of the cardiac orifice and the hiatus in the diaphragm. Dr. Ivy McKenzie (Glasgow) spoke of the problem of spasm at either end of the oesophagus. Sir William Milligan (Manchester) expressed the opinion that cardiospasm was due to spasmodic action of the left crus of the diaphragm, and related some experiments which confirmed that view. Dr. W. S. Syme (Glasgow) described a case of spasm of lower end of the oesophagus well above the opening through the diaphragm. Sir StClair Thomson (London) supported the views of Dr. William Hill. He advocated the formation of a school for the teaching of oesophagoscopy. Dr. James Adam mentioned a case of malignant disease of the hypopharynx that lasted fifteen years.

Mr. A. J. Wright (Bristol) read a paper on congenital choanal occlusion in two members of one family. Sir StClair Thomson related a case in which the obstruction was unilateral and the infant could only be suckled lying on the same side. The paper was also discussed by Dr. Young (Glasgow), Dr. Syme (Glasgow), and Dr. Hutchison (Brighton). Dr. H. H. Forbes read a paper on the present position of the use of radium in the treatment of cancer of the larynx and oesophagus. This was discussed by Dr. William Hill, who insisted on the importance of radiating the whole stricture in cases of malignant disease of the oesophagus. Sir William Milligan, who had had access to a large quantity of radium in Manchester, had on the whole been disappointed with the results up to the present time. He gave an account of his experience of the usefulness and limitations of this form of treatment. Sir StClair Thomson protested against the use of radium in operable cases.

SECTION OF OTOLOGY.

Wednesday, July 26th.

THE discussion on the diagnosis and treatment of septic sinus thrombosis was opened by Sir William Milligan, who dealt in detail with the diagnosis. The importance of early diagnosis and the danger of waiting for classical signs and symptoms to appear was urged, because of the much greater chance of recovery given by early operation. The anatomical conditions in which sinus thrombosis is more likely to occur were also described. Mr. Colledge followed with a paper on difficulties in dealing with such cases; he referred to some special points in the diagnosis, and especially the treatment, with some illustrative cases. In the discussion on these papers Dr. Ritchie Rodger confined his remarks to the cavernous sinus, referring to several illustrative cases. Dr. Mygind (Copenhagen) gave his experience of 141 cases, and advised exploratory operation in cases of doubt and microscopic examination of the sinus wall. He gave interesting statistics of his cases and concluded that ligation of the jugular had little or no influence in determining recovery. Dr. William Hill advocated free removal of bone in doubtful cases in order to expose adequately the sinus. He dealt with the great difficulty in deciding whether the sinus was thrombosed, and if so in what portion.

Dr. Dan McKenzie emphasized the importance of early diagnosis and the harmlessness of early exploratory operation. He advised ligation of the jugular in every case. Mr. Muecke (London) referred to 117 cases operated on by Mr. Hunter Tod and himself. He advised ligation of the jugular in every case, combined with the administration of antistreptococcic serum. Sir James Dundas Grant opposed the ligation of the jugular as a routine procedure, and gave his opinion as to the indications. Dr. Andrew Wyllie (London) advised injections of corrosive sublimate in cases of septicaemia. He referred to the difficulty of knowing in some cases which ear was at fault. Dr. Syme (Glasgow) mentioned an instance of spontaneous cure, the case having been mistaken for puerperal septicaemia some years previously to a radical mastoid operation. Dr. Douglas Guthrie (Edinburgh) referred to unilateral perspiration as an important symptom. Dr. Albert Gray urged the importance of avoiding the slightest injury to the exposed lateral sinus and the use of antiseptics, especially eusol. Dr. J. S. Fraser and Dr. Stephen Young read a paper entitled "Is it worth while to remove aural polypi?" This paper was discussed by Sir James Dundas Grant, Dr. Ridout (Portsmouth), Sir William Milligan, Dr. Mygind, and Mr. Frank Wilson (Newcastle).

At the afternoon sitting Dr. Holger Mygind read a paper on benign forms of otogenic meningitis. This paper was based upon the observation of 210 cases of otogenic meningitis observed in Copenhagen during the last seventeen years. Special reference was made to the examination and characteristics of the cerebro-spinal fluid in this class of cases. The paper ended with a short description of the operative measures required for these conditions, especially the indications for opening the labyrinth.

SECTION OF TUBERCULOSIS.

Thursday, July 27th.

THE PRESIDENT, Sir Robert Philip, in his opening address dealt with the administrative advances which had been made in the control of tuberculosis since the date of the last meeting of the Association in Glasgow in 1888. Tracing the decline in the death rate since that date, he pointed out that the rate had declined 48 per cent. in England and 53 per cent. in Scotland—that is, the diminution had been proceeding more rapidly in the latter country. A discussion on "The clinical differentiation of pulmonary tuberculosis from other respiratory affections" was opened by Dr. E. Rist (Paris), who dealt with the changes which had taken place, mainly as a result of experiences during the war, in our theoretical and practical knowledge of tuberculosis. The necessities of war had put before us the duty of well-founded, uncompromising decision in matters of diagnosis, and for this medical officers were not well prepared in the early days of the war. Mistaken diagnoses were all too numerous. Dr. Rist gave examples from his own experience at a tuberculosis clearing station in France and at the Laënnec Hospital in Paris. At the former a diagnosis of tuberculosis previously made was found to be justified in only 27 per cent. of cases, and at the latter 82 per cent. were found not to be tuberculous. After quoting other figures Dr. Rist dealt in detail with various diagnostic methods. Tuberculin skin reactions could only be regarded as evidence of infection and not of disease. Further, it must be admitted that the individua's whom the von Pirquet test discovered were more protected against subsequent tuberculous disease than were the non-infected. A high place must be given to the *x* rays as aiding differential diagnosis. If used in association with physical examinations they were of great value to the clinician. Their use had enriched our knowledge of chest diseases, and modified our views of the practical value of other methods of physical examination. Methods of detecting tubercle bacilli in the sputum had improved also. Dr. Rist then dealt with the commoner diseases likely to be mistaken for pulmonary tuberculosis—for example, (1) diseases of the cardio-vascular apparatus; (2) non-tuberculous diseases of the lungs; (3) morbid conditions of the upper respiratory passages, which were probably the most common sources of error in diagnosis—indeed, over 50 per cent. of the cases examined at the tuberculosis clearing station belonged to this group.

Professor S. Lyle Cummins (Cardiff), in dealing with his own experience, pointed out the value of studies in vital capacity such as had been recently made by Professor Dreyer and Dr. Charles Cameron. He also hoped that serological tests would in time assist in diagnosis of active from inactive lesions. Dr. Marcus Paterson (London) referred to the great difficulty of distinguishing, in many cases, active from inactive tuberculosis. Some test for this was much needed. He gave

examples of erroneous diagnosis which were still too frequent, and agreed with Dr. Rist that a single positive spit in the midst of a series of negative spits was of little significance. Dr. Ian Struthers Stewart also considered that diseases of the upper air passages were often mistaken for tuberculosis. Dr. James Crocket was inclined to think that much tuberculosis was overlooked and erroneously diagnosed. Dr. A. Hope Gosse (London) gave an important contribution—the results of the recent work by Dr. A. L. Punch and himself—on serological diagnosis. In his hands, using living bacilli as antigen, this test promised great assistance in detection of activity, with very important practical results. Dr. Fergus Hewat (Edinburgh), Dr. C. Muthu (Mendip Hills Sanatorium), Dr. Lawson (Tor-na-Dee), Dr. MacGregor (Glasgow), Dr. Prest (Ayrshire), and Dr. Gillies (Australia), also took part in the discussion.

Dr. James Taylor (Glasgow) read a paper on "Some aspects of the treatment of surgical tuberculosis," in which he gave his experience as visiting surgeon to the Tuberculosis Hospital of Glasgow Corporation at Robroyston, where there is accommodation for 300 patients with surgical tuberculosis. The general treatment is based on that of Dr. Rollier of Leysin, with modifications appropriate to differences in climate. The speaker considered that rapidity of cure depended very greatly on climate—that is, insolation—and he was unable to get the phenomenal results obtained by Dr. Rollier, which enabled more conservative methods to be adopted. While the treatment of surgical tuberculosis must be essentially conservative, in hospitals with the most favourable climatic conditions operative treatment combined with general treatment would give the most speedy, though perhaps slightly less perfect, results. Some results of specific treatment of cold abscesses and sinuses were given. It was difficult to prevent sinus formation, especially during the winter months. Cold abscesses were treated by repeated aspiration with a measure of success. Some who did not respond to this were treated by open operation, with careful surgical technique, and the wound sutured. This was successful in one-third of the cases. The use of modifying fluids had given the best results in cold abscesses. Calot's fluid No. 1 gave the best results, though sometimes naphthol-camphor was used successfully. Dr. Taylor referred to the good results of deep *x*-ray therapy in massive cervical glands, as carried out by Dr. Henderson, radiologist to the hospital. Extreme care was needed in applying antisyphilitic treatment to patients with a positive Wassermann reaction and a definite tuberculous lesion.

SECTION OF OPHTHALMOLOGY.

Wednesday, July 26th.

AT the opening of the first session on Wednesday, July 26th, the President, Mr. A. S. Percival, said that he considered it a high honour that he should be chosen to be President of this Section in so great a university city as Glasgow, and he believed that their proceedings would be worthy of the occasion.

The subject for discussion, "The etiology of optic atrophy," was introduced in a paper on the clinical side by Dr. C. O. Hawthorne of London, followed by Mr. J. Hogarth Pringle of Glasgow, who dealt with the more surgical aspects of the conditions responsible for the atrophy, and by Dr. H. M. Traquair of Edinburgh, who considered chiefly the finer points of diagnosis to be obtained by perimetry. Messrs. MacCallan (Cairo), Percival Hay (Sheffield), Webster Fox (Philadelphia), Bishop Harman (London), Grey Clegg (Manchester), Inglis Pollock (Glasgow), J. C. Douglas (New South Wales), J. A. Wilson (Glasgow), and Thomas H. Bickerton (Liverpool) continued the discussion, which was replied to by Dr. Pringle. A paper on the "Relations of the optic nerve to the sphenoidal and posterior ethmoidal sinuses" was read by Dr. Gavin Young of Glasgow, and specimens illustrating the relations shown. Mr. A. F. MacCallan (Cairo) read a paper on "Ophthalmic progress in Egypt," which was commented upon by Dr. M. A. el Kattan of Cairo and the President. Dr. Wellwood Ferguson of Glasgow read a paper on "The state of the cerebro-spinal fluid in disease of the fundus" and Dr. T. Stewart Barrie's paper on "Monocular and binocular vision," which was discussed by Mr. Bishop Harman (London). Mr. Percival Hay (Sheffield), and Dr. John Rowan (Glasgow). A paper by Dr. W. B. Inglis Pollock of Glasgow, on the "Open treatment in eye operations," completed the proceedings for the day.

Reviews.

THE ENGLISH PRISON SYSTEM.

Two books on the English prison system have recently appeared—the one by SIDNEY and BEATRICE WEBB, dealing nominally with English prisons under local government, but in effect with the English prison system up to date; the other, by STEPHEN HOBHOUSE, M.A., and A. FENNER BROCKWAY, devoted wholly to the consideration of English prisons to-day. The preface printed in the first-named volume, and intended as an introduction to both works, occupies about seventy pages and is written by Mr. BERNARD SHAW. From Mr. Shaw's first sentence, telling the reader of the right spirit in which these books should be read, it is easy to infer at once the uncritical spirit in which the books have been written.

Mr. Shaw assumes at the outset that the authors have established the fact that "imprisonment as it exists to-day is a worse crime than any of those committed by its victims," and advises all would-be "reformers" who hold that "imprisonment is a necessary and beneficent public institution" not to read these books, but to go about their own business. He adds that such reformers have in the past converted the old common gaol "into that diabolical den of torment, mischief, and damnation, the modern model prison." Similarly the joint authors of the book entitled *English Prisons under Local Government*,[1] holding that imprisonment as a punishment for crime is unjustifiable, devote only twenty pages of their Epilogue to a slight sketch of constructive reform of penological methods, adding "that, when all is said and done, it is probably quite impossible to make a good job of the incarceration of a human being in the most enlightened of dungeons." Again, the compilers and writers of the larger book called *English Prisons To-day*,[2] both having been imprisoned themselves as "conscientious objectors," make it abundantly clear in their Concluding Chapter of less than half a dozen pages that they condemn not only imprisonment as a punishment for crime, but also, inferentially, any "punishment" for crime at all. Anent this concluding chapter it may be noted that it mainly consists of an abbreviated repetition of many previous arguments on one side only of the long controversy regarding the State's right to punish law-breakers, and in an implied, if not expressed, assumption that all crime should be regarded as curable, or at least tractable, disease, and treated otherwise than by deprivation of liberty.

These things being so, it follows that serious criticism of the essence of these books should be devoted to what seems to underlie the conclusions and assumptions of their writers, and that this method would involve several fundamental questions of social, psychological, political, legal, and even expediential import. It is equally clear that no one who does not accept the basic dogma of the mortal sinfulness and futility of the institution of penal imprisonment can possibly undertake to controvert that dogma seriously within the limits of any periodical, least of all a weekly journal. As I am such a person, I must therefore confine myself mainly to some short remarks on the constitution of the Prison System Enquiry Committee which produced the report now published under the name of *English Prisons To-day*;[2] on the nature of the evidence chosen by them as the apparent basis of their conclusions; and on only a very few of the fallacious arguments used by the writers of both volumes, among whom Mr. Shaw has a conspicuous place.

1. It is stated in the summary of the Report which Mr. Brockway, the secretary of the Enquiry Committee, has provided as a possible assistance to reviewers, that the membership of the Committee "is representative of the various schools of political thought." This statement may be accurate if the word "political" be intended merely to connote the thought of the officially recognized political parties only; but be this as it may, even a superficial glance at the names of the members of the Committee will detect that schools of thought which differ from the views promulgated in the Report on the main subjects are not represented at all. The Committee was plainly appointed to arrive at certain

[1] *English Prisons under Local Government*. By Sidney and Beatrice Webb; with Preface by Bernard Shaw. London: Longmans, Green, and Co. 1922. (Demy 8vo, pp. lxxiii + 251. 15s. net.)

[2] *English Prisons To-day*. Being the Report of the Prison System Enquiry Committee. Edited by Stephen Hobhouse, M.A., and A. Fenner Brockway. London: Longmans, Green, and Co. 1922. (Demy 8vo, pp. xviii+728; 4 illustrations. 25s. net.)

conclusions, and therefore, quite logically, sought out only the evidence which was appropriate to their end. In the Foreword to the Report, but not in the Summary, it is stated that this inquiry was established by the Executive of the Labour Research Department, but it does not seem clear whether the possible implication that this appointment had a political origin was intended, or whether the Committee was virtually autogenous.

2. The Committee complain that they failed to acquire the information they wanted from the Home Office and the Prison Commissioners, but that they had considerable success from making inquiries for information from fifty members of the prisons staff—for example, chaplains (C. of E. and R.C.), visiting ministers (denominational), medical officers and warders of different grades, etc. They do not state what proportion among these were ex-officers. They add, however, that they believe they have collected substantially accurate information about every phase of the prison system. The genuine nature of their belief need not be doubted, but there is plenty of room to question the accuracy of their information.

3. As to evidence collected from 290 ex-prisoners it is stated in the Report itself, but not in the Summary prepared for purposes of the press, that among these ex-prisoners were "a large number of men and women who had been sentenced to imprisonment (mostly for terms of hard labour) for political offences, but it included also a number of ex-prisoners committed for criminal offences who had had experience of both local and convict prisons." The number of the "political" prisoners is not stated, though it is said to be "large." This justifies the inference that either by failure to find many "criminal" witnesses or by the readiness of the "politicals" to give evidence the net result of the testimony as a whole was likely to be strongly biased. In this context the following short quotations from a very long answer by a "political" prisoner to a "mental questionnaire" submitted to him may be regarded as significant. Among the innumerable effects on his mind, which he seemingly attributes to the prison life, he says: "I wrote more and perhaps better poetry than I had ever done before"; and, in another place, he says that he "entered prison accepting the ethical teaching of Christ and left it an agnostic," and adds, "many other conscientious objectors like myself came out agnostics who had entered with a definite belief in God."

4. Mr. Shaw's doctrine that imprisonment neither deters nor reforms, but manufactures criminals, seems to rest on the fact that large numbers of prisoners return frequently to prison. He ignores the fact that there is considerable evidence to show that about two-thirds of once-committed prisoners do not return at all. It might therefore be more reasonable to infer that imprisonment can be an effective deterrent from continuance in crime, and also that the mere existence of prisons as penal institutions may prevent innumerable potential law-breakers from taking any risk of getting into them than to accept, or still less act upon, the logical method of Mr. Shaw. At any rate it is certain that in the prisons of to-day the mere loss of liberty constitutes by far the greatest element in the punishment of imprisonment; and that although among the class of prisoners described as political, as well as among some others, the loss of liberty as well as other deprivations must be felt more keenly than by the majority of prisoners, there are many more who suffer only from the want of freedom.

Any conceivable and effective substitute for imprisonment that would not involve the loss of the law-breaker's liberty would be welcomed by everybody; but no approximation to such a scheme has yet been even adumbrated. This is by no means to say that further modifications in the administration of justice cannot be made on the existing lines for preventing some offenders from being committed to prison at all, or that no more improvements are possible in the prison regulations themselves. There are, in fact, many desirable improvements which would readily be made were sufficient funds obtainable.

5. Mr. Shaw's method of reasoning in his endeavours to establish a point is well illustrated by the following example. He refers to the Lombrosian doctrine of a "criminal type," which he describes as teaching that criminals are not responsible for their actions, and therefore should not be punished for them. He proceeds to state that "the prison authorities saw their occupations threatened and so denied the Lombrosian doctrine"; and he then insists that if there is no *criminal* type there is a *prison* type manufactured in prison by the prison system. For this statement he gives no proof whatever, adducing as evidence only an irrelevant passage from a publication which is quite unconcerned with crime or prisoners.

After much attention to this familiar assertion, made very frequently at intervals for many years by persons who have visited prisons but once or perhaps twice, I can positively contradict Mr. Shaw's baseless announcement that "the simple truth is that the typical criminal is a normal man when he first enters a prison and develops the 'type' during his imprisonment" by the simple statement that such a type has no existence.

It may be gathered with sufficient clearness from the above notes that the authors of the Report of the Committee of Enquiry, and the rest of the investigators, must have started their work with certain postulates on ethical, social, and other questions which could not fail to influence them while collecting evidence and drawing up their conclusions for publication; and therefore the real matters at issue between the writers of these books and any critic or reviewer of them who cannot accept their initial assumptions are far too wide and fundamental for detailed treatment here. Such treatment of even the few pages of which the concluding chapter of *English Prisons To-day* consists would fill the space of a very lengthy pamphlet at least.

It is not to be denied that some possibly good result might conceivably be obtained if the scheme, slightly sketched in these books, for a practical conversion of prisons into educational and hygienic establishments devoted to the physical and mental examination and treatment of each individual law-breaker sent to them were realized; but considering that about 80 per cent. of committals are for only one month or less the question immediately arises whether the great expenditure thus involved might not be far more fruitfully devoted to the interests of better and wider education than obtains at present for the youth of the community at large. And, as we have already seen, all the five writers of these books are at one in their declaration that no good thing can come out of any form of incarceration.

H. Bryan Donkin.

THE HISTORY OF CARDIOLOGY.

In *The Heart: Old and New Views*,[3] by Dr. H. L. Flint, we have a presentation of the growth of knowledge of the heart and its functions, from the remote past to the present. The author's object has been to give a consecutive history, to link together the more or less isolated data, and to draw a clear picture. Dr. Flint has succeeded in doing this in a pleasing and satisfactory manner. He takes his readers back to 4000 B.C., when there appears to have been no clear distinction made between the heart and the liver. Later, in 1500 B.C., the soul in the form of a mannikin was believed to dwell in the heart. It was about this date that an Egyptian wrote that the vessels lead from the heart to the body.

The book before us is divided into two parts. The former deals first with the Hippocratic period, and traces the gradual growth of knowledge through the Galenic and the Vesalian, ending with an account of the discovery of the circulation by William Harvey. This is perhaps the most interesting section in the book. Though short, the story of Harvey's gradual perception of the vital facts of the circulation is admirably told. Stephen Hales is rightly credited with the first substantial advance in the physiology of the circulation since the time of Harvey, and from then on the outstanding landmarks of progress are noted.

The second and larger part is devoted to a concise description of instruments and methods. Here, as in Part I, the gradual advance in knowledge is recorded, beginning in 1861 with the method of Chauveau and Marey, by which they recorded the intracardiac pressure in the various chambers of the heart. The gradual development of the instruments for recording blood pressure is related, and there is an account of the sphygmograph, polygraph, and the electro-cardiograph. Normal records from these instruments are analysed and explained.

A section is usefully devoted to the five functions of the myocardium, first clearly described by Gaskell; then follows an account of the cardiac irregularities and abnormal rhythms, which is fully illustrated with characteristic records.

In the penultimate section Dr. Flint discusses the significance of the systolic murmur, and gives support to the contentions of Lewis and his co-workers, more especially as to the negligible

[3] *The Heart: Old and New Views.* By H. L. Flint, M.D. London: H. K. Lewis and Co., Ltd. 1921. (Demy 8vo, pp. 183; 65 plates. 15s. net.)

importance of such a bruit, both in prognosis and treatment, in the absence of any evidence of heart disease.

Sir Clifford Allbutt, in an introductory preface, expresses his appreciation both of the matter of the book and the manner of its presentation.

PAPERS FROM THE MAYO FOUNDATION.

THE first annual volume of *Papers from the Mayo Foundation for Medical Education and Research and the Medical School*[4] covers the period 1915-20 of the Graduate School of the University of Minnesota and represents research work carried out, principally by the younger members of the staff, in the Mayo clinic and in the hospitals controlled by the medical school of the University of Minnesota. Nearly all the articles in this collection, which must be distinguished from the familiar *Collected Papers of the Mayo Clinic* now in double figures, were originally theses for the degree of Master of Science or Doctor of Philosophy in various pre-clinical or clinical subjects.

The articles, sixty-five in number, are arranged under the ten headings of alimentary tract, uro-genital organs, ductless glands, circulatory organs, blood, skin and syphilis, the nervous system, the head, trunk, and extremities, metabolism, and general, the last including papers on bacteriology, serology, and the effects of inanition on albino rats. Some of the papers are published in full, others in abstract only, reference in all cases being given to the periodical in which they originally appeared.

The field covered is very extensive, as has already been suggested, and the articles treat aspects of the various sciences ancillary to medicine; this may be shown by mentioning a few of the subjects: the geotropism of the marine snail (*Littorina littorea*), growth of the human foetus (several papers dealing with various parts of the body), the development of the suprapericardial (post-branchial, ultimo-branchial) body in *Squalus acanthias*, and the development of the liver and pancreas in Amblystoma. There are also many papers bearing on ordinary medical practice, such as carcinoma of the prostate, the treatment of chronic empyema, and gastric cancer. Pathology receives due attention both from the point of view of morbid anatomy and in its experimental aspects: examples of the former are papers on the histogenesis of carcinoma in the islets of Langerhans by E. J. Horgan, and a study of 256 cases of squamous-celled epithelioma of the skin by A. C. Broders; and of the latter Dr. S. W. Harrington's paper on the effect on the kidney of various surgical procedures, such as double ligation and section of one ureter and decapsulation of the kidney; it is based on experiments on the dog because of the similarity of the anatomy, and especially of the physiology, to those of man. The volume is a record of enviable activity. As it is edited by Mrs. M. H. Mellish, whose work in this capacity for the *Collected Papers of the Mayo Clinic* is so well known, there is no need to say that it is admirably brought out.

NOTES ON BOOKS.

IN fulfilment of a promise to the late Sir Lauder Brunton Mrs. ERNEST HART has published a booklet for the help of housekeepers and cooks in the preparation of food for diabetics.[5] At the outset we may say that it is a pity that the able authoress has set forth in her opening pages a list of "forbidden" foods, and at the same time laid down in general terms "permissible foods." The modern therapy of glycosuria and diabetes does not follow such simple rules. Nevertheless this collection of recipes is well calculated to enable a skilful cook to convert a bare catalogue of foodstuffs prescribed by the physician for an individual case into sufficiently appetizing dishes to make a strict regimen not merely tolerable but even tempting to the eye and the palate. Colonel Waters in his recent work on *Diabetes* (reviewed on June 24th, 1922, p. 1000) remarked: "It is of little moment in what form the various foods are given." Mrs. Hart's little book serves to remind us that to the patient there may be a vast difference between the same physiological food-values cooked in a dixie by the regimental cook, or placed on the table by a disciple of Brillat-Savarin.

[4] *Papers from the Mayo Foundation for Medical Education and Research and the Medical School.* Graduate School of the University of Minnesota. Philadelphia and London: W. B. Saunders Co. 1921. (Med. 8vo, pp. 659; 203 figures. 50s. net.)

[5] *Dishes for Diabetics.* By Mrs. Ernest Hart. London: J. Bale, Sons, and Danielsson, Ltd. 1922. (Cr. 8vo, pp. 43. 2s. 6d. net.)

INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE.

THE first session of the third International Congress of the History of Medicine was held at the Royal Society of Medicine on July 18th, the President, Dr. SINGER, in the chair. The opening proceedings on July 17th were reported in our issue of July 22nd.

Plague.

Dr. TRICOT-ROYER (Antwerp) gave an account of the orders of the magistrate of Antwerp against the spread of the plague in the seventeenth century. In 1661, by the orders of the local authorities, the canals were constructed so that the contaminated water from the southern canals should not mingle with that of those of the northern district of Herenthals. Dr. Tricot-Royer described the method of filtering the water, and then gave a description of the lazar-house of Herenthals and the chapel dedicated to St. John the Baptist, patron saint of lepers, in the grounds. Twice yearly pilgrims visited the chapel, bringing gifts to the lepers.

Professor JEANSELME sent a paper in which he argued that in the history of the Byzantine Empire the climatic conditions were often the cause of plague; when the Greeks lost Egypt to the Arabs they were deprived of the greater part of their corn, so that famine arose and the people more readily succumbed to the plague. He attributed the distribution of disease to the fact that the rats, carriers of the plague, finding the granaries empty, left the sewers and subterranean areas and came into closer contact with man.

Dr. WICKERSHEIMER (Strasbourg) described the visitation of the black plague to Strasbourg in 1349 and gave an account of the precautions taken. According to a contemporary account the disease attacked the population in the following manner: on the first day they were seized with sickness, the next day with shivering and fever, and the third day the glands appeared under the arms and on the legs. He gave an account of the various remedies given and also the carrying of musk, wormwood, and other aromatic substances as preventives. The death roll in Strasbourg from this visitation amounted to about 16,000 out of a probable population of 30,000.

Dr. NEVEU (Paris) then gave an account of plague in Tuscany in the fourteenth century, and described the terrible onset and the great mortality from it during the Middle Ages, when so little was done in the way of rational treatment.

Greek Medicine.

Dr. CAVVADIAS (Greece) read a communication on the cult of Asklepios and medical science. He recognized two divisions of Greek medicine: the medicine of observation, that appealing to intelligence, what might be called rational or true medicine; and mystic medicine, faith healing, the power of suggestion acting with the hidden forces of the soul within ourselves—the cult of medicine shown in the religious medicine of the Greco-Roman period, of the Middle Ages, and in the Christian Science of to-day. The Greeks had their gods to cure disease and avert death, and of these Apollo, discoverer of medicine and physician to all Olympus, was the head. This alliance of the god of art and music with medicine showed that these three branches were considered by the early Greeks the foremost in the art of living. Asklepios, in some legends described as a son of Apollo, was not originally one of the Pantheon. He was a king with a great skill in medicine; he was deified and became foremost god of medicine. Though his followers practised their art by the temples of Asklepios they were not priests. For some time they passed their teachings from one to another orally, but later, probably about the second century A.D., written documents of medical advice began to be circulated, and culminated in the writings of the Hippocratic and Cnidian schools. The patient passed some days at the healing centres, where the united prayers of the priests and patient were offered up for a cure. The patient was also instructed by the priests in the religion and superstition to help a cure by suggestion. Then the patient was put to sleep in a certain place and the healing god, probably a priest, appeared to him.

The Chadwick Chapter in the History of Medicine.

Sir WILLIAM COLLINS said that Chadwick might well be called the father of English sanitary sciences. He belonged to the noble army of early Victorians, and was born in 1801. His father was a journalist and editor of *The Statesman*, and

Chadwick himself after being called to the Bar wrote largely for the press. During the first great cholera epidemic (1831) he studied its causes. The conditions under which the poor lived and died, and the utter inadequacy of sanitary arrangements at that period, claimed his attention, and in 1832 the Commission was appointed to investigate the Poor Law, and Chadwick was appointed commissioner. He did a great work in ameliorating the conditions, and achieved legislation on the employment of children in factories. It was due to his survey of the overcrowded parts of our towns and cities that the sanitary reform was introduced into Great Britain which eventually led to this country giving the lead to the other nations of the world as regards sanitation. Chadwick's own work and that of his school stood for solid achievement in the advances of hygiene and sanitation, the great handmaidens of medicine. He lived to see the vindication of his theories, and died in 1890 after a most useful life; his name was remembered the world over as a pioneer in sanitary science, and was undoubtedly worthy of a place in the history of medicine.

Dr. HUNTER gave an account, by a diagrammatic map, of the sanitary reforms made in the time of Chadwick. He pointed out that the death rate is now one-eighth of what it was fifty years ago. He gave statistics of the decrease of typhoid, scarlet fever, diphtheria, measles, and whooping-cough.

Anatomy.

Mr. W. G. SPENCER described an *Epitome* of Vesalius on vellum in the British Museum Library; it was once the property of Richard Meade and about 1754 was sold for £8 12s. The only other known vellum copy was in the library at Louvain for 371 years, but there was proof that it was burnt when the library was destroyed in 1914. Vesalius apparently intended the text for the common man rather than for the use of artists and medical students; he demonstrated the nude male and female bodies, always taking the most perfect specimens of young adults. Afterwards five muscle diagrams were shown, giving the muscles contracting in motion, and two or three diagrams of skeletons.

Dr. LAIGNEL-LAVASTINE (Paris) described how throughout the ages symbolism had been applied to anatomy. The astrologer established a relation between the planets and parts of the body. The moon dominated the brain, the sun the heart, Jupiter and Mercury the liver, Saturn the spleen, the skeleton, the joints, cartilages, and right ear, Venus the throat, the veins, the internal generative organs, the scalp and the features, such as chin and cheek. The Cabalists attributed the different organs and functions of man to the twelve simple letters of the Hebrew alphabet. This ancient mediaeval symbolism was not altogether to be despised, for it was the foundation on which scientific knowledge grew, the method of conserving it, the frame to incorporate it and transmit to our descendants the scientific inheritance laboriously acquired by observation of nature.

Professor W. WRIGHT spoke on Leonardo da Vinci's work on the structure of the heart. Owing to da Vinci's interest in and great knowledge of mathematics it was only to be expected that he should have given special attention to the circulatory system. The three great anatomists of that period were Leonardo da Vinci, who died in 1519, Eustachius, who died in 1574, and Vesalius, who died in 1564. At that time the difficulties of research were very great owing to the lack of bodies to dissect and the lack of preservatives. Leonardo da Vinci mentions doing his dissections in the dead of night. One can imagine the scene taking place in the old stone buildings of Rome and Florence in the flickering candle light, the mutilated and quartered bodies, and the stench. The eeriness of the surroundings must have been greatly increased by the fact that the period was one of great superstition and appalling crime. Professor Wright concluded by giving a description of some diagrams of Leonardo da Vinci.

Dr. LANDER, in a paper on women as anatomists, said that women students of anatomy might be divided into five groups, according as their objective was midwifery, surgery, philosophy, dilettantism, or professional anatomy. He gave short biographical accounts of the various famous women surgeons known in history, starting with Theodosia, martyred in the reign of Diocletian, following with women at Salerno, and coming down to the eighteenth century, when isolated women still continued to practise surgery in spite of the proceedings against them. In midwifery women had always held a prominent position, though often practising without knowledge and innocent of all anatomy. France was the first country to educate midwives adequately to their task, Louise Bourgeoise in the sixteenth century being perhaps the most famous. Amongst English midwives, Mrs. Jane Sharp, Mrs. Sarah Stone, and Mrs. Clark were advocates of teaching anatomy to midwives. The women philosophers went back to the time of Pythagoras, whose wife carried on his school after his death. From the fifteenth to the eighteenth century many women studied anatomy in the Italian universities; the University of Bologna produced several professional women anatomists, the most famous of whom was Anna Morandi, who married the painter and sculptor John Manzolini; she learnt modelling from her husband and far surpassed him. After his death she became a teacher of anatomy in the University.

Dr. E. T. WITHINGTON gave a very interesting account of Galen's knowledge of anatomy, tracing it back through his early work, and Mrs. SINGER read a paper on a thirteenth-century Latin translation of the sixth book of the *Epidemics* in the library of St. John's College, Cambridge. It had a preface in Latin.

In a paper on the beginnings of anatomical teaching in the United States Dr. KRUMBHAAR said that anatomy was studied in the States from the early pilgrim times, but, as in other countries, there was a difficulty in acquiring material for dissection, and in 1647 Massachusetts passed a resolution to provide the body of a criminal once in four years. He illustrated his subsequent remarks by portraits of anatomists and pictures of buildings.

Aerostatics.

Dr. F. J. POYNTON broke new ground in a paper on "Doctors and the dawn of aërostation." He enlarged on the part played by doctors in the conquest of the air since 1783. Amongst those whose scientific discoveries had aided flight were Joseph Black, Priestley, and Lavoisier. The Frenchman, Pilâtre Rozier was the first to use hot air for a balloon, and the Scotsman Titler the first to do so in England. He gave some account of the invention of the Italian Lunardi, and of Jeffries and Blanchard, and concluded by a reference to the controversy between the adherents of flying by hot air and those of flying by gas.

An English Rural Practitioner of the Seventeenth Century.

Dr. N. G. HORNER read a paper entitled "John Westover of Wedmore," based upon an old manuscript journal illustrating rural medical practice in the West of England at the end of the seventeenth century. John Westover belonged to a family which lived at Wedmore in Somersetshire for 300 years. He was born in 1643 and died in 1706, and left behind him in the house where he lived a journal, or day-book, which has been preserved ever since by the subsequent tenants. The book gives a daily record of his medical and surgical practice, and of the business of his farm, during fifteen years —1686 to 1701. Nearly every item contains a note of the fee charged and the amount actually paid. Dr. Horner showed the book and gave a few extracts from it, to indicate the range of Westover's practice and his fees, and also the manner in which he recorded his patients' ailments and the remedies he prescribed. The commonest complaints were "itch" and "wormes." He had no obstetrical practice, but treated a great many fractures and dislocations. In 1680, on the death of his father (who was also a chirurgeon), he built a stone outhouse for the accommodation of insane patients who came to board with him; many entries in the journal refer to these in-patients and the fees paid by their relatives. Westover's fees were sometimes paid in money, sometimes in work done on his farm, sometimes in goods. The debt was usually paid by instalments, and part of it was often forgiven. His handwriting is difficult to read, and the spelling is eccentric, but the document gives an idea of the work and character of a country general practitioner in England 250 years ago.

History of British Pharmacy.

Mr. J. B. GILMOUR, in an historical sketch of British pharmacy, mentioned that the first apothecary's shop was established in London in the fourteenth century, and in Edinburgh in the fifteenth and sixteenth centuries, though drugs and spices were already being sold by grocers. Later a Royal Charter was granted, protecting apothecaries against this irregular practice. In the seventeenth century, in the time of Boyle, mercury was introduced into medicine, and chemical

laboratories were formed. Later, pharmaceutical laws were passed, and systematic inspection of shops to prevent impure drugs being sold was instituted; in the nineteenth century, after numerous cases of poisoning by arsenic, a bill was passed restricting the sale of poisonous drugs, and in 1921 a Dangerous Drugs Act came into force to attempt to safeguard the public from opium traffic. The Pharmaceutical Society of Great Britain was formed to raise the status of scientifically trained pharmacists and protect the public, which, on the whole, it has succeeded in doing.

Hiera Picra.

Mr. C. J. S. THOMPSON, M.B.E., in his paper on hiera picra, traced the history of this ancient remedy from the time of Themison in the fifth century B.C. The name meant "Holy Bitter," and according to tradition it was first used in the temples of Asklepios in Greece. Its chief ingredients were aloes and colocynth, and formulae were given by Pachius, Alexander of Tralles, Archigenes, Theodoretus, Galen, Rufus, Mesue, Myrepsus, and others. It became official in the first Pharmacopoeia in 1498. In was included in the London Pharmacopoeia of 1627 and continued in further editions down to 1851. Mr. Thompson said that there was still a demand for it in Great Britain, Belgium, France, and other parts of Europe, and it was sold in the pharmacies of these countries as it was in Damascus, Rome, and Alexandria before the Christian era. It had thus survived over two thousand years.

The Pomander Stick.

Dr. MICHAEL FOSTER, in a paper on the pomander stick, described the sticks carried by doctors during the seventeenth and eighteenth centuries. The heads of these canes were of pear or apple shape and contained a receptacle for aromatic substances, which were regarded as a sovereign protection against plague and other diseases. He mentioned various types of pomander sticks, those with a top which could be unscrewed, in which aromatic substances could be placed, others with a perforated head like a vinaigrette, containing a sponge soaked in aromatic vinegar. He thought these canes were exceedingly rare, and only knew about twelve actually in existence. He mentioned that the canes carried by the beaux of that time differed greatly from the pomander stick, and the surgeons and apothecaries also carried a different type, the pomander stick being characteristic of the physician only.

Visit to Barbers' Hall.

On the afternoon of Wednesday, July 19th, members of the Congress visited Barbers' Hall, in Monkwell Street, and were received by the Master, who welcomed them to this interesting memorial of the ancient guild life of the City of London. He then called on Mr. Weston, a past master of the company, to describe the Hall, its history, and its treasures. Mr. Weston's learned address was listened to with great interest by a large company, seated under Holbein's famous picture of Henry VIII granting his Charter to the United Companies of Barbers and Surgeons. He described the Hall as the cradle of surgery in England, and briefly spoke of the origins of barbers and surgeons and their early craft guilds. The Hall of the Company had been on this site under continuous ownership since the end of the fourteenth century. He showed the first Charter granted to the Barbers by Edward IV, and the fifteenth-century Black Book of Ordinances of the joint Company, containing a copy of the earliest licence to practise surgery in England. He next showed subsequent charters and other valuable possessions of the Company, including the silver-gilt cup given them by Henry VIII as a new year's present; Charles II's gift of a silver cup in the shape of a crowned Boscobel oak; and the silver punch-bowl presented by Queen Anne, and described by *Punch* as big enough to bath the baby in. Mr. Weston then told the story of Holbein's masterpiece—the most famous and most valuable picture in the City of London; how it was returned safely to the Hall after being borrowed by James I; how it was removed for safely to Moorfields during the Great Fire of London; how it was kept in the National Gallery strong-room during the air raids; and lastly, how it escaped purchase by an American millionaire. He pointed out Thomas Vicary and the other surgeons and barbers, the royal physicians and the King's apothecary, kneeling humbly on either side of their contemptuous monarch, and explained that the colours of the picture could not be restored in the usual way because it was painted upon a surface of gold-leaf laid on smooth oak panels.

St. Bartholomew's Hospital.

On Friday afternoon the members of the Congress visited St. Bartholomew's Hospital, when an historical address on the hospital was given by Sir D'Arcy Power.

Entertainments.

On Tuesday the Lord Mayor and Lady Mayoress held a reception at the Mansion House, and the Lord Mayor welcomed the members to the City of London in a few well-chosen words. In the evening a reception was given by Sir James Purves Stewart and Lady Purves Stewart. A musical conversazione was held at the Wellcome Historical Medical Museum on Wednesday evening. The visitors numbered about two hundred, and were received by Mr. H. S. Wellcome, Mr. C. J. S. Thompson, and Dr. Andrew Balfour. On Thursday evening the members of the Congress were entertained at a reception by the Vice-Chancellor of the University of London and Mrs. H. J. Waring. There was a large attendance at the banquet which was held at the Hotel Cecil on Friday evening. Dr. Singer presided, and was supported by Sir Humphry Rolleston, Sir Frederick Kenyon, Sir D'Arcy Power, and the Master of the Apothecaries' Company. The toast of "The International Society of the History of Medicine" was responded to by Dr. Tricot-Royer, and Sir Frederick Kenyon replied on behalf of the guests. On Saturday the members of the Congress joined in an excursion to Windsor Castle and up the river Thames.

(To be continued.)

CONFERENCE ON MENTAL DEFICIENCY.

A two days' Conference on Mental Deficiency, held under the auspices of the Central Association for Mental Welfare, was opened at the Caxton Hall, Westminster, on Wednesday, July 26th. Sir LESLIE SCOTT, K.C., the Solicitor-General, presided.

Crime and Mental Deficiency.

Sir BRYAN DONKIN argued for attaching a more comprehensive meaning to the term "mental deficiency" than its present technical and artificial one. It should include every kind of insanity. Such co-ordinate arrangement of the various groups of mentally disordered or defective persons under one comprehensive heading might lead to a better understanding between thoughtful jurists and physicians on the matter of criminal responsibility. It seemed to him that the only proof of defective mind (in whatever category such may be classed) that a court of justice should require when a plea of responsibility was set up ought to be based on the same kind of evidence as is now required in cases of certifiable insanity. He was strongly opposed to any suggestion likely to lead to decision on a prisoner's responsibility to the law being left to medical evidence alone.

Dr. NORWOOD EAST said that his experience as a prison medical officer had led him to the opinion that the criminal defective might be considered from two points of view, according to whether the defect had been recognized before or after conviction and sentence. Those who escaped detection before conviction could be observed whilst serving their sentence, and transferred if necessary to an institution for defectives under Section 9 of the Mental Deficiency Act. Owing to the disadvantage of a conviction being recorded against such a person prison medical officers endeavoured to diagnose the defect before trial, and in this they were assisted by the frequency of magisterial remands for inquiry. A medical examination alone did not suffice. Information must be got of the individual's early history, especially of the years between leaving school and arrest. The manner of crime might assist in deciding whether insanity or defect was responsible for the offence. The vocabulary test was one of the most valuable single tests, but the most important was the prisoner's capacity to earn his own living and to conform to social requirements. The greatest difficulty arose in dealing with adolescents whose conduct suggested defect, but the experienced clinician remembered that some cases of this nature settled down normally after adolescence and proved a hasty early diagnosis of defectiveness to have been erroneous. The tendency to extend the description of certain types of defectives beyond the strict statutory definition might lead to complacency in diagnosis, to a false idea of knowledge, and a failure to study adequately the borderland group. In conclusion, Dr. East spoke of the desirability of establishing treatment clinics for cases of mental disorder and defect. Observation and treatment at a clinic would prevent many cases from committing a criminal action.

The CHAIRMAN said that the question of responsibility for crime in a case where there was mental defect was essentially one of degree. Whether enough consideration had been given to the acts of physical impulsion in crime he did not know; but there was paramount need for greater study of the subject. The Conference, however, was concerned not so much with legal punishment as with the treatment of the defective so as to prevent his commission of acts which in a normal person would be called crime. People must be made to realize that mental illness (of whatever sort) was not a disgrace. It was necessary to educate the public, and he would like to see this educational campaign launched. The problem was a health problem, and in his opinion the Board of Control should be under the Ministry of Health.

Mr. A. H. TREVOR (Legal Commissioner, Board of Control) then took the chair.

Dr. T. B. HYSLOP recognized the term "mental deficiency" as one of convenience derived from usage. Illustrating his remarks by reference to the teaching of that great pioneer, the late Dr. Hughlings Jackson, Dr. Hyslop said that in insanity as in mental deficiency we were apt to concentrate our attention on the abnormalities of action of the "undamaged remainder," and neglect the actual disease which resulted in disorder of the controlling mechanism itself. Now that the nation had reached the "stadium convalescens" after the war, efforts on behalf of those who, through no fault of their own, were deprived of the ability to maintain themselves should be increased.

Mr. HAROLD COX thought that steps should be taken to prevent mental defectives from being brought into the world. He advocated sterilization of mental defectives, but was opposed to compulsory sterilization.

The CHAIRMAN said the whole subject had been referred to the Medical Committee of the Association.

Dr. W. A. POTTS (Medical Adviser to the Birmingham Justices) agreed with Dr. East that not more than 5 per cent. of prisoners were defective. The remaining percentage should be studied. The solution of the problem regarding other prisoners would be got by a study of mental defect. Amongst others who took part in the discussion were Dr. RICKETT (Newcastle) and Dr. SHACKLETON (Bradford).

Mental Defectives in the Courts.

In the afternoon session, when Dr. W. A. POTTS presided, a paper on the need for correlation between the courts, the prison departments, and the Mental Deficiency Act Committees was read by Mr. STUART DEACON, stipendiary magistrate, Liverpool, who speaking from over twelve years' experience in Liverpool, declared his belief that the Mental Deficiency Act was a great boon, more particularly to the poorer members of the community. Many heart-breaking problems had been solved for magistrates by its provisions. He believed that the spirit of the police-court administration should be rather the cure of a patient than the punishment of an offender. In the wise administration of the Act in our police courts, more particularly with regard to children and young adults, there lay not only a certain reduction of the ranks of potential criminals, but the opening of an avenue of research into the causes of crime, the penetration of which by the joint and experienced minds of magistrates, prison officials, and mental experts acting in whole-hearted co-operation might lead to the diminution of the criminal population by numbers at present inconceivable.

Mrs. PATRICK R. GREEN dealt with the difficult position of justices in regard to hearing petitions presented by the local authorities or by the guardians of the defectives. Justices generally acted on the principle that "prevention is better than cure"; if defectives were not safeguarded early enough they generally came before the courts sooner or later. Legislation was urgently needed by which it would be made obligatory to deal with the defective delinquent under the Mental Deficiency Act; in addition there should be a statutory obligation on all courts to provide the services of a medical expert to advise justices on the mental condition of persons charged. The visitors of the local voluntary associations had done magnificent work. Through their efforts the working of the Act had been made possible.

The CHAIRMAN differentiated the mental defectives and the psychopathic cases. The latter got no benefit from being in an institution for mental defectives, and their presence often led to unfortunate occurrences.

Dr. HUGHES (Stoke-on-Trent) thought that intelligence defect and moral defect were not so highly correlated as had been supposed. He referred to the various methods he had adopted to get hold of the delinquent as early as possible. He had got his best results in the cases brought by the parents themselves. In his opinion moral imbeciles should be sent to industrial schools. The moral effect of a conviction being recorded against anyone was enormous. To prevent this cases must be got early.

Dr. THOMSON (Birmingham) criticized Sir Leslie Scott's statement that mental deficiency was to be regarded as other diseases, and that the public should be taught that no stigma attached to it. This was a dangerous doctrine, for it was the stigma which prevented the amount of mental deficiency being greater than it was.

Dr. HUBERT BOND (Board of Control) urged the need of co-ordination between medical staffs of institutions and those occupying public positions. There should be correlation between the prison medical officers and the medical officers of mental hospitals. He reiterated his plea for fluidity of service. Regarding our present procedure, only the prima facie cases were sent for medical examination. The goal to be aimed at was that every prisoner when he came before the court and was found to have committed an offence should have his case medically inquired into. The discussion was continued by Dr. C. W. LITTLE (Newcastle), Dr. BREWER (Swindon), and others.

Address by the President of the Board of Education.

On the second day of the Conference the chair was taken at the morning session by Lieut.-Colonel W. E. RALEY, President of the Association Education Committees. The opening address was delivered by the Right Hon. H. A. L. FISHER, President of the Board of Education.

Mr. FISHER said that there was little difference of opinion with regard to the general principles which formed the public policy of the State. The first principle was that every child capable of profiting by a course of education in a public elementary school should go to one. The second, that every child unable, by reason of mental deficiency, to profit by that education should be removed; for not only did such a child derive no benefit itself, but its presence acted as a drag and an incubus upon the education of its schoolmates. The third principle was that the children who were so excluded should be divided into two classes—those who could be educated to earn the whole or a part of their livelihood, and could be taught to manage their own affairs and to take part in society as decent citizens, and those who failed to satisfy these tests. The first class, it had been decreed, should be educated in special schools under the Board of Education, while the second class should be handed over to the Board of Control, for supervision at home or custodial care. The Board was educating at present in special schools for the mentally defective 15,138 children, but it was calculated that the total number of such children in England and Wales was 31,000. The total cost of educating the children in special schools was £436,000; if an attempt were made to educate the whole body of 31,000 children who could be classed as mentally defective, day school provision of 19,000 and residential school provision of 12,000 would be required, and an additional expenditure entailed of £977,000, upon which the Board's grant would be approximately £480,000. The Board was not considering the abolition of the special teaching of feeble-minded children under proper conditions altogether, nor was it exploring the lowering of the school-leaving age in special schools from 16 to 14. It was, however, considering the reduction of the teaching cost in its special schools, and unless it could effect some reduction in the teaching cost, and obtain the assistance of the teachers' organizations in effecting this, it was vain to hope that they should be in a position, within a measurable time, of covering any considerable part of the fresh ground which they ought to occupy with as little delay as possible.

Occupation Centres.

Dr. H. B. BRACKENBURY (who was unable to be present) contributed a paper on economic difficulties which prohibit the development of special schools. He expressed a fear lest the Board of Education, in looking for a way to reduce its expenditure, might reduce the money spent on the care and education of mentally defective children. Admittedly, such care and education were costly, and it was only fair to ask for proposals by which a reduction in cost might be effected. After considering certain suggestions put forward to this end, Dr. Brackenbury urged that a plan deserving special attention was that of the attendance of low-grade feeble-minded

children at occupation centres for training and teaching. The advocacy of occupation centres involved no sinister intention of supplanting special schools. They would not replace or act as alternatives to special schools for high-grade children. Some such suggestion deserved consideration to prevent many thousands of feeble-minded children being neglected or abandoned.

The discussion which followed was opened by Mr. SPURLEY HEY (Director of Education, Manchester). Amongst those who took part were Dr. THOMSON (Birmingham) and Dr. DOUGLAS TURNER. In the opinion of the latter the only way in which the present difficulties could be met was by extending the system of occupation centres.

In the afternoon the chair was taken by Sir COURTAULD THOMSON (Chairman of the National Council for Mental Hygiene). Mrs. ANDERSON (Case Secretary, C.A.M.W.) said that there were a great number of children between the ages of 7 and 16 who had been tried at a special school and "excluded," or in areas where there were no special schools had been turned out of elementary schools because they could not be taught there. If these children were left to themselves the inevitable result was deterioration in mental and moral condition. Occupation centres had been tried to meet this need. Low-grade defectives could be taught to do housework very well, and were happy in doing it. The occupation centre was an enormous boon to the overworked and nerve-wrecked mother. Mrs. Anderson related her experiences of occupation centres and considered it possible to run such a centre successfully at the rate of £7 a head. In her opinion defective children had a great deal of character and were very conscious of a right or wrong atmosphere. The earnest and devoted worker had a recompense in watching this unfolding and in the love and affection which these unfortunate little ones were so eager to give her.

Miss RUTH DARWIN (Commissioner, Board of Control) read a paper on working hostels and other institutional methods of dealing with defectives. She believed that besides institutional treatment other methods should now be tried.

In support of the contention that numbers of high and medium grade defectives are capable after proper training of taking their place in the world as harmless and partly self-supporting citizens, Miss Darwin quoted extracts from pamphlets by Dr. Fernald, superintendent of the Massachusetts School for the Feeble-minded at Waverley, and recounted the experiences of Dr. Bernstein of the Rome State School. The experience gained at Waverley showed that there was a class of adult defectives for whom permanent institutional treatment was unnecessary, uneconomical, and in some cases not conducive to happiness; these men and women were, however, unable to fend for themselves in the world. What was needed in many cases after the necessary training had been provided was a half-way house between unrestricted liberty and the wholly restricted life of an institution. This would be partly met by the provision of hostels for mentally defective men and women where they would be under detention, but from which they could go out to work by the day.

The CHAIRMAN said he had been very much impressed by a remark made by Sir Leslie Scott to the effect that parents ought to be taught that there was no stigma or disgrace in having mental disorder in their family. He did not think that it would be too much to ask that parents should be educated to the point of recognizing the earlier obvious symptoms of mental disorder so that they could call in medical advice or, what was of equal or greater value, educational advice at the earliest possible moment.

Short addresses were delivered on the work accomplished by occupation centres in their areas by Miss I. M. BRYAN (Portsmouth), Miss ELFRIDA RATHBONE (London), and Mrs. J. COOKE HURLE (Somerset). Miss NINA BOYLE (Mothers' Defence League) considered that insufficient attention had been paid to some of the causes of mental deficiency such as underfeeding. The administration of some institutions for mental deficients called for the sternest criticism.

Mr. A. H. TREVOR (Board of Control) said, in the course of discussion, that a proposal had been laid before the Treasury to allow an increased grant to voluntary associations for the purpose of starting occupation centres. He believed and hoped there would not be much objection to certain amplifications of the grants for this purpose.

PROFESSOR SANARELLI, director of the Institute of Hygiene, has been elected rector of the University of Rome.

THE second International Congress of Comparative Pathology will be held in Rome on September 20th.

IN-PATIENT TREATMENT OF OPHTHALMIA NEONATORUM IN LONDON.

IN 1918 the Metropolitan Asylums Board, at the request of the Ministry of Health, established an institution—St. Margaret's Hospital, Leighton Road, Kentish Town—for the treatment of cases of ophthalmia neonatorum. This hospital, to which certain open-air (balcony) wards were subsequently added, now contains accommodation for sixty cases, including beds for mothers, who are encouraged to accompany their babies, and treatment is available for those mothers who are willing to receive it. The accommodation provided at the hospital has, however, never been fully utilized, except for occasional short periods, and the Board has also experienced a continuous difficulty in securing the admission of babies in the earliest stages of the disease. From time to time various steps have been taken with a view to the more extended use of the hospital, but these have not met with such success as had been hoped for. The Board, therefore, recently convened a conference to discuss the measures which it might be thought could usefully be taken to secure that greater advantage should be taken of the facilities provided by the hospital. This conference took place at the office of the Board on July 19th, 1922, and was attended by the following:

Representatives of the Board.

Mr. Walter Eickhoff, J.P., Chairman of the Board.
Mr. C. Botterill, Chairman of the Infectious Hospitals Committee.
Dr. Lauriston Shaw, Vice-Chairman of the Infectious Hospitals Committee.
Miss M. E. Broadbent, Chairman of the St. Margaret's Hospital Subcommittee.
Dr. F. F. Caiger, Chief Medical Officer, Infectious Hospital Service.
Mr. M. S. Mayou, Ophthalmic Surgeon, St. Margaret's Hospital.
Dr. C. Price, Medical Officer, St. Margaret's Hospital.

Representatives of other Authorities.

Ministry of Health.—Mr. H. O. Stutchbury, Assistant Secretary; Dr. Janet Campbell, Senior Medical Officer.
London County Council.—Dr. Elizabeth MacRory.
Section of Ophthalmology, Royal Society of Medicine.—Sir John Parsons, C.B.E., F.R.S., Mr. J. B. Lawford, F.R.C.S.
Metropolitan Branch, Society of Medical Officers of Health.—Dr. T. Shadick Higgins, Medical Officer of Health, St. Pancras; Dr. C. Porter, Medical Officer of Health, St. Marylebone (Hon. Sec.).
Local Medical and Panel Committee for London.—Dr. W. Coode Adams and Dr. J. H. Traquair.
Central Midwives Board.—Dr. J. S. Fairbairn and Mr. H. G. Westley, M.A. (Secretary).
Midwives' Institute.—Miss Rosalind Paget and Miss Olive Haydon.

The proceedings were opened by the Chairman of the Board, who presided, and briefly explained the position.

The ophthalmic surgeon attached to the hospital (Mr. Mayou) said that roughly one-third of the cases of ophthalmia neonatorum notified in London were admitted to the hospital, the figures being:

	1919.	1920.	1921.	1922.*
Number notified ...	870	1185	1076	436
Number admitted ...	281	252	213	115

* To June 17th.

On an average cases were received on the ninth day of the disease, but in other large towns it was about the fifth day. Instances occurred in which cases were not sent to St. Margaret's Hospital until corneal ulceration had developed. The eyes could be saved by appropriate treatment if the cases were received sufficiently early. St. Margaret's Hospital had got the name of a hospital for venereal diseases, and objection had been taken to it by some on that account, but every effort was made at the hospital to avoid any difficulty on this score.

During the general discussion which ensued the work done at St. Margaret's Hospital was referred to in very appreciative terms, and the opinion was expressed that some time must necessarily elapse before the existence of such an institution became generally known in London. It was considered that the percentage of cases notified who were admitted to the hospital was not unsatisfactory, as a large proportion of cases did not need hospital treatment. Emphasis was, however, laid on the desirability of the more prompt notification of cases. It was also stated that many medical students were not adequately instructed in ophthalmology. The objection to the hospital on the ground of its association with the treatment of venereal disease was felt to be one which was very difficult to remove. Further, home duties prevented many mothers from entering the hospital with their infants.

Reference was made from various points of view to the dual control of midwives, who are required to notify the case to the borough medical officer of health where this has not been done by a medical practitioner, and also to inform their local supervising authority, the London County Council, under the regulations, of any emergency (such as the occurrence of ophthalmia neonatorum) in which they had called in medical assistance. It was urged that an institution such as St. Margaret's Hospital was valuable also as affording facilities for the training of midwives, who might, moreover, obtain further experience there after their training as to the best methods of treating ophthalmia neonatorum.

The Board was advised not to seek to extend the method of treating cases of the disease in an institution such as St. Margaret's Hospital until the Departmental Committee on Blindness had submitted its report, as it might be found that there was a better way of dealing with these cases.

THE ADMINISTRATION OF PUBLIC MENTAL HOSPITALS.

REPORT OF THE COMMITTEE OF INQUIRY.

THE Committee of Inquiry into the Administration of Public Mental Hospitals presented its unanimous report to Parliament on July 31st. The Committee, which consisted of Sir Cyril Cobb (chairman), Dr. Percy Smith, and Dr. Bedford Pierce, was appointed by the Ministry of Health in December last to investigate the charges made by Dr. Lomax in his book, *The Experiences of an Asylum Doctor*. It has held twenty-three meetings, and examined thirty-eight witnesses, who included representatives of official bodies, medical superintendents, nurses, members of visiting committees, some independent persons, and seven ex-patients; Dr. Lomax refused to give evidence on the ground that the inquiry should have been by Royal Commission. The report is based on the evidence submitted by these witnesses, on information derived from memoranda, on the results of a questionnaire which was sent to the medical superintendents of twenty-one mental hospitals, and on the Committee's own observations on visiting eight institutions, in six cases without previous announcement.

Dr. Lomax's General Charges.

The Committee points out in its report that Dr. Lomax is not a specialist in mental or nervous disorders; that the experience on which his book is based was derived from his services in one mental hospital extending over a period of nineteen months under war conditions, when, with fourteen mental hospitals closed, there was overcrowding in the others, together with shortage of staff and difficulty regarding food; that many of his statements are based on hearsay evidence or no evidence at all; and that there are gross exaggerations and some statements which are demonstrably untrue. Dr. Lomax attacked what he called the "system," but the Committee points out that there is no "system" in the sense of an arrangement which produces uniform treatment, and therefore no justification for his assumption that what he found in one institution would probably be found in most others, if not in all. The Committee also finds that Dr. Lomax's suggestion that mental hospitals are barrack-like buildings, and that the patients are herded together without classification, is untrue of mental hospitals generally, and grossly exaggerated in the case of Prestwich (on which institution Dr. Lomax based his statements, and where the members of the Committee spent two days in investigation), although the arrangements for the reception of new patients at Prestwich are inadequate.

The Committee is satisfied that there is no ground for the allegation that systematic ill treatment by the staff prevails in mental hospitals (this was not a point very strongly made by Dr. Lomax, but the press gave prominence to sensational statements made by a few witnesses before the Committee). The Committee believes that the public fails to realize the exacting nature of the work which nurses have to do for patients, and the dangerous character of many of their wards. In the two decades before the war there were seventeen instances of one patient's death being caused by another patient, and eight instances of murderous assault upon the superintendents or other medical officers. It is often necessary, therefore, to use considerable force in restraining patients, but, apart from this, there is nothing to justify the allegations of brutal treatment.

Charges Affecting Medical Supervision.

A serious charge made by Dr. Lomax was that sedatives or purgatives were indiscriminately used, and that patients were kept drugged, and were purged with croton oil as a form of punishment. This charge could be investigated by means of very exact tests obtained from the prescription records of the institutions and from the audited statements of drug purchases. The results of the investigation, taking a period of three years, went entirely to disprove the allegation. At Prestwich Asylum the Committee asked for returns of sedatives administered in one week in 1921 and another week in 1922. The highest number related to a sedative drug, doses of which were given during the week in question to 55 women out of a total of 774 in the institution. The figures for other institutions showed that the administration of sedatives was limited. As for croton oil, this was used at Prestwich, but there was nothing to show that it was used without proper authority. Out of twenty-two institutions furnishing returns fifteen showed that they had not used it at all.

Another allegation referred to the unnecessary detention of patients in institutions. The Committee has discovered no evidence that persons who have recovered their sanity are detained in mental hospitals, but if arrangements for after-care could be improved, and if properly sheltered conditions were available outside, a certain number of patients who did not really need institutional care any longer might be discharged. With regard to the suggestion that no treatment is given, and particularly that there are no facilities for surgical operations, the Committee asks that it may be borne in mind that surgical operations cannot be performed with the same security on the insane as on the sane; but again it finds that there is nothing to show that facilities for surgical treatment are inadequate, or that every effort is not used to restore the insane to health and sanity. Finally, Dr. Lomax referred to the stationary recovery rate. The Committee finds that the recovery rate compares favourably with the recovery rate in general hospitals. One curious fact is that while in one asylum of the most modern construction and equipment the recovery rate is 28.2 per cent., in one of the oldest institutions in the country it is between 33 and 34 per cent. The present recovery rate, even if not improving, is nevertheless very creditable to those who have the care of the mentally afflicted.

The Committee's Recommendations.

Something more positive emerges from the report than the mere disapproving of Dr. Lomax's statements. One of the recommendations is that in future the size of mental hospitals should, as far as possible, be limited to the accommodation necessary for 1,000 persons. In the classification of patients account should be taken of home conditions and surroundings. The superintendent of the mental hospital should be a medical man, with undivided control of the medical and administrative work; and a small advisory committee, preferably associated with the Board of Control, should be available for consultation by visiting committees when making these appointments. The number of assistant medical officers should be increased, and facilities provided for study leave.

Certain other recommendations have to do with the nursing staff. The present rigid system involving short shifts of duty should be discontinued; the hours devoted by each member of the staff to nursing proper should be relatively few, and more time should be given to the nurse's social duties. Other recommendations favour a more varied diet; more attention to the employment of patients, which would be assisted by the appointment at each hospital of an occupations officer; and the strengthening and extension of after-care work. The co-ordination of higher research work by its concentration in a few fully equipped institutions is held to be worthy of consideration.

The opinion is also expressed that the Board of Control needs additional assistance to carry out its work, and that locally it is desirable for visiting committees to be strengthened by the co-option of persons with special qualifications and time to devote to the work, and that some small unofficial committee might be authorized to visit the mental hospitals from time to time. Another matter which has engaged the attention of the Committee is the system under which patients may be visited by their relatives and friends. As far as possible—having regard always to the fact that an insane person may suddenly become violent—friends should be admitted to see the patient actually in the wards, and not in a separate room or corridor. This would go far to disabuse the public mind of the idea that the mental hospital is a place rigidly enclosed and not available to public criticism.

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THE GLASGOW MEETING.

THE reports we were able to publish last week will have told those who were not fortunate enough to be present that the ninetieth Annual Meeting of the British Medical Association was one of the most successful ever held. The attendance was very large, and the whole proceedings were marked with the energy and the air of good-fellowship so noticeable during the last two Annual Meetings at Newcastle and Cambridge. No more appropriate site for a congress of this size could be imagined than the splendid buildings of the University of Glasgow, which provided accommodation for all the scientific Sections, with the Bute Hall as a meeting-place for the Representative Body and the larger social functions. From all three aspects—the scientific and clinical, the political, and the social—the Glasgow meeting of 1922 will long stand out in the annals of the Association. Even the weather, of which great things were not expected, did its best to rise to the occasion.

It is right and fitting that the figure which stands out in the mind of every member who attended this meeting should be that of the President. Had he taken little active part in its proceedings, a medical congress presided over by Sir William Macewen would have gained distinction from his professional eminence and his commanding personality. But the President was the central figure of the week's work and pleasure, and his keen interest in all that went on was an inspiration to every one of the 1,500 members and their many guests. It is no exaggeration to say that Sir William Macewen personified both the spirit and purpose of the meeting and the hospitality of Glasgow. His address at the Glasgow meeting in 1888 was one of the most remarkable contributions to the surgical literature of the time. His presidential address this year on the same subject (with which his name and work will ever be associated) has been described by Sir Frederick Mott as a message to all English-speaking doctors which will be welcomed by them as the last thing said on the subject of brain surgery, and it was informed throughout with the philosophic understanding of a great mind.

The scientific sections, large though their number was, were well attended, and the topics chosen gave occasion for many interesting and profitable debates. We print this week a series of notes of the first day's scientific and clinical proceedings, which will serve to give a brief outline of the papers and discussions. A complete account of the earlier proceedings of the Medico-Sociological Section appears at page 195, and in subsequent issues we shall publish full reports of the work of the other eighteen sections. The afternoon demonstrations, which have become an established feature of the Annual Meetings, were again most successful, while the excellent Pathological Museum, the Public Health Exhibition, and the Trades Exhibition were visited by large numbers.

The publicity given to the proceedings of the Representative Body and of several Sections by the leading Scottish newspapers, and indeed by the lay press at large, was very noticeable. This is an advantage both to the public and to the Association—to the public by making known to it the general aims and methods of the organized medical profession; to the Association because much of its scientific and professional work is of a kind that flourishes best in contact with well-informed lay opinion. The Annual Meeting serves to remind us all that the chief object of Medicine is the public good. That this is appreciated by responsible newspapers is, we think, shown in the general trend of the comments upon the two principal topics debated by the Representative Body—professional secrecy and hospital policy. Each of these matters abounds in difficulties, but the second is the larger and in some ways the more complex, and a very big part of the Representative Meeting was spent in an attempt to build up an agreed policy within the scaffolding laboriously set up by the Hospitals Committee. A full account of the discussions and conclusions on the hospital question will be found in this and last week's SUPPLEMENT. As we observed last week, it is not surprising that the Association should find great difficulty in exactly defining its position. Briefly put, the outcome of this meeting is that the Council's report and recommendations on the organization of voluntary hospitals were in the main accepted by the requisite majority, and with certain modifications have become the policy of the Association. But there was an evident cleavage of opinion on certain fundamentals, and one important recommendation was taken back for further consideration. We hope in an early issue to discuss more fully the directions in which policy has been modified, and to give some estimate of the practical effect of the decisions reached. Meanwhile we would add a word of praise to the Chairman of the Hospitals Committee for his indefatigable labours in committee, in Council, and in the Representative Body; Ministers piloting a contentious bill through the storms of Westminster might envy him his powers of endurance. Looking back on the four arduous days spent in medico-political business, we may compliment also the Representative Body as a whole, and its chairman, Dr. Wallace Henry, in particular, on completing a stiff course in workmanlike style.

Of the social side of the ninetieth Annual Meeting it should suffice to say that this was under the charge of Scottish hosts, who for months beforehand had spent themselves in perfecting local arrangements. Brief notes of some of the delightful entertainments are printed elsewhere; but it would be impossible to acknowledge all the hospitality offered to members and their families by the medical profession of Glasgow, by the University, and by the civic authorities. In the same way we can only mention a few outstanding names from among the groups of willing workers. The pivot of the whole meeting was the Honorary Local General Secretary, Dr. George A. Allan, whose tireless energy made him ubiquitous. All day and every day he seemed to be at the President's right hand and in a hundred places besides; no one was forgotten and nothing overlooked. Dr. R. A. Hendry was invaluable in dealing with accommodation in hotels and lodgings; this work was under his sole control. Dr. McCutcheon did fine work as transport officer; while Mr. Kay and Dr. F. W. Martin looked after the entertainments in general, with much help from others, notably from Dr. Shannon in the plans for the annual dinner. On the financial side, Professor T. K. Munro and Dr. James H. Martin must be mentioned; also Mr. Harold Yarrow, who acted as treasurer, and Sir John Reid, a member of the executive, who was constant in his attendance and always ready to help. In the organization of the reception room Dr. Allan and his deputy, Mr. James Russell, had valuable aid from Dr. McGregor Robertson. The printing arrangements owed much to Dr. John Patrick and Dr. Cruickshank, the former taking a large share in the production of the *Book of Glasgow* (reviewed by us last week) and

the latter in the *Handbook* of the meeting. In conclusion, we should like to name all the ladies who helped to make the meeting a success, but this would be invidious, for (as a member from a neighbouring island remarked) the Ladies' Executive worked splendidly to a man.

ANNUAL MEETING NOTES.

The Erskine House Hospital for Limbless and Disabled.

Perhaps not the least interesting of the many excursions organized for the Annual Meeting in Glasgow was that to the Princess Louise Scottish Hospital for Limbless and Disabled Sailors and Soldiers, Erskine House. A large party of ladies and gentlemen who visited Erskine House on the afternoon of July 28th were exceedingly pleased with the work of the hospital and charmed with the beautiful mansion house and surrounding scenery. This institution owes its origin to Sir William Macewen. Very early in the war he recognized that maimed and limbless sailors and soldiers in large numbers would require to be cared for, in regard to provision and repair of artificial limbs, and assisted to render themselves useful citizens by being taught suitable occupations. Sir William Macewen enlisted the sympathies of the citizens of Glasgow, and was supported by an influential committee, which included the Marchioness of Bute, the Marquis and Marchioness of Ailsa, Mrs. Pollock of Ayr, Sir John Reid, Mr. Harold Yarrow, Mrs. McCowan, Miss Anderson, Sir Thomas Dunlop (Lord Provost of the City Glasgow at the time), and many members of the medical profession. Erskine House, formerly the residence of Lord Blantyre, well known in Glasgow and the West of Scotland for his many legal contests with the Clyde Trust, was gifted by Sir John Reid, D.L., Deacon Convener of the Trades' House, for the purpose of the hospital. The mansion is on the left bank of the Clyde, in an estate of 500 acres, a situation in every respect ideal for the purpose. The hospital was ready for patients on October 10th, 1916, and formally opened by Princess Louise on June 6th, 1917. The magnitude of the work may be estimated from figures which have been supplied by Sir John Reid, vice-chairman of the committee. The total number of patients fitted with limbs from the opening until the end of May, 1922, was 6,263, and 4,394 limbs were repaired. The amount of subscriptions received up to the present date is £321,014 1s. 7d. The generous public of Glasgow made many contributions to the hospital. The *x*-ray room, for example, was completely equipped from the proceeds of a matinée performance in the Alhambra Theatre. The *Glasgow Evening News* organized a subscription list amongst its readers, chiefly in small sums; this fund amounted to £17,000. Mr. and Mrs. Morton of Troon presented the beautiful recreation hall, with stage, billiard tables, and cinematographic apparatus, in memory of their son. Many single beds were endowed by many donors and societies.

The hospital is governed by a voluntary committee, at the head of which is the Lord Provost of the City of Glasgow for the time being, and the committee includes most of the ladies and gentlemen already mentioned. The trades which are taught in the Erskine workshops include shoemaking, basketry, tailoring, saddlery, hairdressing, cabinet-making, and rural industries. After completion of training at Erskine many of the men, with the aid of a Government grant, have set up business for themselves in various parts of the country and abroad. A most important part of the work is the manufacture and fitting of artificial limbs and appliances. The furniture and other articles made are sold in the shops of the Erskine Hospital in Glasgow. At the meeting on July 28th the new President of the British Medical Association, Sir William Macewen, described how he was assisted by Messrs. Yarrow in the manufacture of limbs, and told how the drying of the wood, which was obtained from the neighbourhood, was accomplished, and how the workshops of Messrs. Yarrow's shipbuilding yard turned out parts for artificial limbs as quickly and as efficiently as renowned makers of these limbs. On the same occasion Sir John Reid invited the ladies of the party to inspect the kitchen arrangements, which he assured them (and they proved for themselves) are up to date in every respect, electric cooking and central heating being employed throughout. The thanks of the visiting party were offered to Sir William Macewen and the committee by Mr. Hempson, solicitor to the Association.

University Reception.

On the evening of July 26th the Principal and Vice-Chancellor, Sir Donald MacAlister, and Lady MacAlister welcomed the guests of the University of Glasgow in the Bute Hall. The hall itself, the Randolph Hall beyond, and the Hunterian Museum were soon well filled; and light and colour—the scarlet of academic robes preponderating—combined with music and the animation of reunion between old and new friends, to present a vivid contrast to the austerities of the Representative Meeting so lately concluded in the same setting. In the course of the evening the Chairman of Council, seconded by Mr. Harold E. Yarrow, C.B.E., honorary treasurer of the meeting, expressed the Association's appreciation of the generous hospitality offered by the Court of the University, claiming the Vice-Chancellor as arbiter of the destiny of the profession in another place (the General Medical Council). Sir Donald MacAlister's brief reply was warmly received by all present.

Civic Reception.

On the afternoon of July 27th the members of the British Medical Association were given a civic welcome in the handsome City Chambers, which occupy one side of George Square. The reception was attended by large numbers, many of whom wore academic dress. In the absence of the Lord Provost and Senior Magistrate, the guests were received in the Satinwood Salon by Bailie James A. Stewart, Acting Chief Magistrate, and a number of his colleagues. Bailie Stewart afterwards extended a formal welcome to the visitors in the Banqueting Hall, and expressed the Lord Provost's regret for his absence. Perhaps nowhere in the Empire, he said, could the British Medical Association meet more appropriately than in Glasgow, where successive generations of illustrious men had made outstanding contributions to the progress of medical and surgical science. The records of the city and its University contained the names of some of the most eminent surgeons and physicians of the world, and Glasgow was proud to think that to-day it still held in its midst men occupying the highest rank in the profession. He felt that it would be unpardonable in a gathering met to do honour to medical men if he omitted to mention the greatest of them all—one who had shed imperishable lustre upon the annals of surgery, who by his discoveries had been the means of saving hundreds of thousands of lives, and who would be regarded by future generations as one of the greatest benefactors of humanity. It would be an everlasting disgrace to the city if the historic Lister ward, with its beneficent associations, were ever demolished or removed. Sir Humphry Rolleston, K.C.B., President of the Royal College of Physicians of London, briefly offered the thanks of the British Medical Association to the civic authorities of Glasgow, adding that not only was Glasgow famed for enterprise in commerce, industry, and education, but also in hygiene. Sir Thomas Oliver, Professor of Medicine in the University of Durham, who associated himself with the expression of thanks, remarked that there were many directions in which medical research could aid the development of commerce, as, for instance, in the conquest of malaria; in such ways fresh opportunities would be given for the expansion of British enterprise. On the motion of Sir William Macewen a vote of thanks was accorded to Bailie Stewart. While the guests were taking tea music was provided by Mr. Meredith Kay's orchestra in the Banqueting Hall.

THE OFFICIAL RELIGIOUS SERVICE.

THE official religious service (Presbyterian) was held in St. Mungo's Cathedral on Tuesday afternoon, when the President, the Chairmen of Council and of Representative Meetings, and a large number of members were present. Prayer was offered by the Very Rev. W. M. Clow, D.D., Principal of the United Free Church College, and the lesson was read by Sir Donald MacAlister, K.C.B., Principal and Vice-Chancellor of the University. The address was delivered by the Rev. James MacGibbon, M.C., D.D., minister of the cathedral, who took his text from the words: "The Son of Man came not to be ministered unto, but to minister, and to give His life a ransom for many" (Matthew xx, 28). The worth of a profession, he said, was determined by its purpose, and the supreme power in the world was personality. In no profession did a practitioner come into closer touch with others than in the profession of medicine, and there was no profession in which purpose and personality were more imperative. Hippocrates, the father of medicine, must ever remain the type of the perfect physician. It was said of him that he was learned, observant, humane, and of overmastering desire that his experience should benefit others, also that he was pure of mind and master of his passions. Such *philanthropeia* must be the motive of all *philotechneia*. The character maintained by Hippocrates was repeated two thousand years later by one much less renowned, whose name and memory were preserved in that cathedral—Peter Lowe, founder of the Faculty of Physicians and Surgeons of Glasgow, who flourished at the end of the sixteenth and beginning of the seventeenth century.

What had been said of religion (continued the preacher) was true also of medicine—it was an art as well as a science, and as such it implied that reason must work with faith, the emotion with the intellect, even as spirit with matter. The presence of many members of the British Medical Association in that house consecrated to the worship of God as revealed in His Son was a virtual acknowledgement that they believed that the ideal of the physician had been given them in Jesus Christ. In Jesus Christ purpose and personality were combined—pure purpose, perseverance in it to the utmost, with a power of personality which was immeasurable. Christ's efforts for the restoration of man were threefold—teaching, healing, suffering. Healing had been a science, more or less, ever since earliest times, but in all its history it had never revealed anything like the character it possessed in the hands of Jesus Christ. In His method of healing Christ had no forerunner and no successor. He used no drug, He performed no operation; of whatever law of healing He made use, it was a law which depended on Himself for its effectiveness. He was, as it were, the embodiment of the health He restored, just as He was the embodiment of the teaching He gave. It was probable that Christ selected expressly the character of the Son of Man in order that it might be clear to all generations that He claimed to act, not in virtue of powers which mankind could not share, but in virtue of powers which man might and should possess and exercise. "He that believeth on Me, the works that I do shall he do also, and greater works than these shall he do." The Greatest was unique, but no monopolist. He wrought to such effect because He was without sin. It had been said that if sin were to cease, suffering would also cease, but sin meant not only suffering, it meant waste of energy. A great consecrated personality was a channel of power. In conclusion the preacher said that what remained to be achieved in the medical profession was far greater than what had hitherto been accomplished. The domain of medicine bristled with Everests yet unscaled. The further conquests which they prayed God would be made, and to which, by God's help, the present Conference would in some measure point the way, would be no less costly than the victories achieved in the past, and those victories were most likely to be gained by those who humbly and resolutely found in Jesus Christ a noble purpose and a supreme example, and maintained as their continual habit a close fellowship not only with one another, but with Him.

SURGICAL OPERATIONS AND DEMONSTRATIONS.

As in the two previous years, the Surgical Section attended a series of demonstrations on the three afternoons of the meeting from 2.30 till 4. These demonstrations were arranged under the general direction of Mr. R. H. Parry, and most of the surgeons in the hospitals of Glasgow willingly assisted. On Wednesday and Thursday afternoons Sir William Macewen gave demonstrations in the Surgical Laboratory on hernia and on tumours, the latter with illustrated methods of teaching. On the afternoon of Wednesday, July 26th, demonstrations were carried out by surgeons of the Royal Infirmary. Two wards with side rooms attached were, by the courtesy of the superintendent, emptied of their ordinary patients, and all the cases and specimens for demonstration were collected together in groups. Each surgeon demonstrated his own cases, and the visitors circulated round the wards. The cases were of varied interest, including knock-knee, Albee's operation, oesophageal diverticulum, carcinoma of the stomach, congenital deformities. On Thursday afternoon, July 27th, demonstrations were held chiefly in the Royal Hospital for Sick Children, when Dr. Leonard Findlay showed methods of injection of alcohol in treatment of rectal prolapse and venesection of scalp veins in infancy for obtaining blood for Wassermann reaction and for administration of salvarsan. Mr. Alexander MacLennan gave a demonstration on scoliosis with cinematographic illustrations. Mr. Alexander Mitchell showed skiagrams of bone regeneration, and Mr. William Rankin showed various surgical cases. On Friday afternoon, July 28th, demonstrations were held both in the Western Infirmary and in the Victoria Infirmary. In the Western Infirmary Mr. Edington showed results of laparotomy by transverse incision, and Mr. Archibald Young showed cases of Perthes's disease, excision of upper jaw for sarcoma, colostomy, gastrectomy, and laminectomy. Mr. Young showed also a series of cases of fractures treated by operation, and cases of elbow fractures and epiphyseal separation treated by plating, pinning, etc. In the Victoria Infirmary Messrs. Farquhar Macrae and Robert Carslaw showed cases of mobile ascending colon operated on by the method suggested by Mr. George Waugh, and Mr. Waugh himself operated on an actual case. Mr. James Russell showed some orthopaedic cases—infantile paralysis, club-feet, congenital dislocation of hip—and cases of excision of colon for malignant disease.

A new feature was introduced by the Arrangements Committee at this meeting, on the suggestion of Sir William Macewen, who felt that the early morning hours before the meeting of Sections might be utilized. Accordingly, the surgeons of the infirmaries were approached, and nearly all intimated their willingness to perform operations from 8.30 till 10 each morning. These early morning meetings were generally well attended, and appeared to justify the innovation. Sir William Macewen himself led the way, operating on each of the three mornings, his operations being the radical cure of hernia, osteotomy, and mastoid operation; on these mornings also he demonstrated the end-results in cases of cerebral abscess and the end-results of complete removal of the tongue for carcinoma. In addition to the surgeons of the three large infirmaries—Royal, Western, and Victoria—morning operations were performed by the gynaecologists in these infirmaries, in the Royal Maternity and Women's Hospital, and in the Royal Samaritan Hospital for Women.

SATURDAY'S EXCURSIONS AT GLASGOW.

The last day of the Annual Meeting was given over entirely to the enjoyment of whole-day excursions.

Firth of Clyde Excursion.—A party of 400 left the Broomielaw at 9.15 for a sail on the Firth of Clyde. It was only by mutual arrangement with the three railway companies that this was possible, as the last Saturday of July

is the busiest Saturday of the year. The turbine steamer *Duchess of Argyll*, the boat which carried the party, is "the baby" of the Caledonian Steam Packet Company's fleet, and played no mean part in the war; during the time when the submarine warfare was at its worst she conveyed over 300,000 officers and men to and from France without mishap, and in all made 655 trips. Captain McWaughton, who commanded the boat during the whole period of her war service, was in charge. The weather at the start of the trip left something to be desired, but fortunately it cleared up later, and a most enjoyable day was spent. The ship took the party down the Clyde, called at Gourock to take up a few passengers, and then sailed up Loch Striven and Loch Ridden and thence through the Kyles of Bute and round Bute into Rothesay. A party of about 150 left the steamer at Rothesay in order to be present at the ceremony of the presentation by Provost Eben MacMillan of the Freedom of the Royal Burgh of Rothesay to Sir William Macewen, a native of Rothesay. The ceremony took place in the courtyard of Rothesay Castle, and was thoroughly enjoyed by all present. Sir William was accompanied by Lady Macewen and by their three daughters, three sons (Dr. J. A. C. Macewen, Dr. Hugh Macewen, and Dr. William Macewen), and two small grandsons. The steamer meanwhile sailed round the Cumbraes and returned to Rothesay in time to pick up the party after the ceremony was over, after which she proceeded some little distance up Loch Long and thence down to Gourock, where the party disembarked and was conveyed by a special train to Glasgow, arriving at Glasgow about 7 p.m. Music was supplied on the boat by the kind offices of the Caledonian Railway Company. The arrangements for the trip were admirable, and all those present were delighted with the excursion.

Stirling Trip.—Another most enjoyable trip was the Stirling and Bridge of Allan trip. A party left Glasgow by train for Stirling, where motors were provided in order that the company might see the sights in Stirling, Bridge of Allan, and Dunblane. The Provost of Stirling and the Provost of Bridge of Allan attached themselves to the party at Stirling. General Stirling entertained the party at Keir and conducted it over the Castle, the Wallace Monument, and Dunblane Cathedral. A very enjoyable visit was also made to the famous Keir Gardens, and an opportunity was afforded of seeing the mineral wells at Bridge of Allan. The arrangements for the Stirling trip were in the hands of Dr. Hossack Fraser.

Ayr Trip.—Another party left Glasgow by train for Ayr, where motors were provided in order that the places of interest in and around Ayr might be visited. The arrangements for this trip were in the hands of Dr. G. Douglas McRae, President of the Glasgow and West of Scotland Branch, and the President of the Burns Federation, Mr. Duncan McNaught, LL.D., accompanied the party. Dr. Crerar of Maryport was another who contributed in no small measure to the success of the trip. Tea was kindly provided by the Marquess and Marchioness of Ailsa at Culzean Castle.

It was a wise move on the part of the local Entertainment Committee to have a transport section, which was presided over with great skill and energy by Dr. J. G. McCutcheon. In his work Dr. McCutcheon was ably assisted by, amongst others, representatives from the Caledonian Railway, the North British Railway, and the Glasgow and South-Western Railway.

Medical Missions Reception.

Sir Donald MacAlister presided at a meeting in the Randolph Hall on Friday afternoon, July 28th, after a reception given by Mr. and Mrs. A. Ernest Maylard to those attending the British Medical Association Annual Meeting. In a few striking sentences the Principal of the University commended the cause of medical missions. The original mandate to the first missionaries was "to preach the Kingdom of God and to heal the sick." This was recorded by a physician, and it was not for us to discuss our orders but obey them. Calling for an advance, Sir Donald MacAlister said that the Church that ceased to grow at the margin had begun to wither at the heart. The religion that did not strive to gain the whole world was doomed to lose its own soul. Like a forest fire, it must go on or go out. Propagation was the law of its being, not merely of its well-being. Dr J. Howard Cook, who had organized the meeting, explained that it was intended not to represent any one missionary society but the whole cause of medical missions. Dr Albert Cook, who had been the founder of the great mission hospital of the Church Missionary Society in Uganda in the year 1896, gave a graphic description of the hospital with which he and his brother who had just spoken had been long associated. The hospital as it is to-day occupies a series of buildings on a beautiful hillside; it embraces every branch of medical and surgical practice. There are the usual blocks containing wards for men, women, and children, with good facilities for operations, about 1,000 having been performed during the year. The Wellcome dispensary and the Roosevelt block were referred to, the former the gift of Mr. Wellcome, and the latter opened by Mr. Roosevelt on his visit to Uganda. Special blocks have been erected for English patients and for Indians, and a motor block secures the lighting of the hospital and contains a good *x*-ray outfit. A medical school and maternity training school form part of a scheme for supplying the whole country with needed help. Dr. and Mrs. Albert Cook had recently engaged in an educational tour on venereal disease at the request of the Government, and they believed that from 40 to 90 per cent. of the population were infected. Dr. Duncan Main, also of the C.M.S., spoke in the place of Dr. Christie of Manchuria, who should have represented Scottish missions. Both of them are graduates of Edinburgh University, and have built up great hospitals with medical schools in their respective centres. Dr. Main has recently received a gift of £10,000 from a generous Scottish donor for his medical school, and his great endeavour is to supply the medical needs of China through her own sons and daughters. Dr. Fletcher Moorshead, as medical secretary of the Baptist Missionary Society, suggested that the medical profession at home could best help the work (1) by influencing public opinion at home; (2) by helping to secure much-needed medical recruits; (3) by sending current literature such as the British Medical Journal to medical missionaries; (4) by helping to supply apparatus and equipment. Either he or Dr. Cook would be glad to put anyone in touch with doctors who needed help if members of the profession would communicate with them.

The Temperance Breakfast.

A large number of members attending the Annual Meeting were entertained by Lord Rowallan (better known as Mr. Cameron Corbett, M.P.) at the National Temperance League breakfast in the University Union on July 27th. Among those present were Mr. C. P. Childe (President-elect of the Association) and Dr. Wallace Henry (Chairman of Representative Meetings). Allusion was made by the host to the removal from their midst during the year of Sir Alfred Pearce Gould, whose address last year at Newcastle would be long remembered. The address on this occasion was given by the Rev. Courtenay Weeks, M.R.C.S., who anticipated the discussion in the Medico-Sociological Section the following day by speaking of the vast amount of damage to the human economy which alcohol brought about, and urging that there was no place for the old traditional routine use of alcohol, although a considerable number of members of the medical profession were still in a backwater in this respect. It was the supposed food value of alcohol which proved so alluring to many, but he thought it was now generally agreed that the substance was deleterious to the higher centres and impaired the mental functions. He referred in particular to the report of McDougall and Smith to the Medical Research Council on the effects of alcohol during normal and fatigued conditions. Mr. Weeks concluded his address by remarking that he had no doubt himself as to the energy-giving value of alcohol:

during his work in the slums of London he had seen too many women with black eyes ever to doubt it! As the hour for the beginning of the work of the Sections was approaching, the breakfast-table discussion had to be curtailed, and a vote of thanks was accorded to Lord Rowallan for his hospitality, on the motion of Dr. Wallace Henry, seconded by Mr. C. P. Childe, and supported by Mr. McAdam Eccles. Mr. Childe referred to the great progress in temperance reform which had taken place of recent years. When he first went to Portsmouth there was ten times as much drunkenness as there was now. It was also formerly the custom to find the sherry always set out on visiting the patient's house; now one only found it at the funeral! Lord Rowallan, acknowledging the vote of thanks, remarked how greatly he had enjoyed the experience of being a patient at Guy's Hospital after a recent cab accident, so that he came out feeling better than he had ever done in his life.

THE MINISTRY OF HEALTH.

THE annual report of the Chief Medical Officer of the Ministry of Health for 1921 has just been published. We gave last week a preliminary notice of the annual report of the Ministry, but Sir George Newman deals more specifically with strictly medical matters; his report will afford to the medical profession, to the public health service, and to the general public much food for thought. Happily it is published by the Stationery Office at the price of 1s. 6d. (it can be ordered through any bookseller), so that both its price and mode of distribution place it within the reach of all interested persons. It consists of an introduction, ten chapters, and some appendices, but in the crowded state of our columns at present we cannot do more than give a brief indication of its general scope. Sir George Newman has written his introduction with full recognition of the limitations which the present financial position of the country imposes. Speaking generally, he says that in the present state of national finance it is clear that the expenditure on public health matters "cannot be allowed to increase indefinitely, and that the strictest economy must be practised. The immediate business, as it seems to me, of every local authority is not to take one step more in expenditure until and unless they are fully satisfied that the work they have already undertaken is thoroughly economical and is rendering full interest. The public expenditure in dealing with tuberculosis, venereal diseases, and maternity and child welfare has inevitably grown to serious proportions, and, though relatively small (only 1 per cent. of local rates) as compared with that of other services, it is absolutely essential that no money should be laid out which is not immediately necessary in the interest of public health. Every pound expended must be made to yield the full value of a pound. Such a standard is not only necessary but it is eminently desirable in the interest of the work itself." He reminds local authorities that thrift and wise expenditure are parts of true economy. "If there be a certain sum of money to spend on communal health, it is inexpedient to indulge in stunts or spasmodic efforts in this direction or that, which arrest attention at the moment, rather than on a carefully considered policy, the principal elements of which must be regarded in an ordered sequence." Here and there we find some characteristic thrusts *ad hominem*, as, for instance, that the question, "What is the use of all our expenditure on health?" is often asked by persons "who do not reflect that their welcome presence among us, alive, alert, and competent, is itself the answer." The first chapter deals generally with the state of public health in England, the next with maternity and child welfare, and others with general epidemiology, with infectious diseases introduced form abroad, with tuberculosis, with venereal diseases, with the relation of food to health, with the insurance medical service, and with medical and sanitary administration. The last chapter reviews briefly the work of the Ministry in relation to medical intelligence, investigation, and international health. We hope to deal more fully with the report in an early issue.

THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE annual report of Sir Arthur Keith, F.R.S., Conservator of the Museum of the Royal College of Surgeons of England, gives particulars of numerous additions made during the year and refers to the large amount of research work carried out, much of it in the Pathological Department, which is directed by Professor S. G. Shattock, F.R.S. The Conservator is able to report the completion of the arrangements with the War Office with regard to the army medical war collection. Under the agreement come to last November with the Secretary of State for War, the Council of the College becomes responsible for the housing, display, completion, upkeep, and cataloguing of the collection, which will form an intrinsic part of the College Museum and be made available for inspection and study at the same times as other parts of the Museum. Specimens, however, will be at the disposal of the professors at the Royal Army Medical College for teaching purposes. By structural alterations in certain buildings attached to the eastern part of the Museum it will be possible to provide a large room to accommodate the war collection, which when complete will comprise 2,000 wet specimens and 500 dry specimens, besides drawings, radiograms, photographs, models, and casts. The actual preparation and description of specimens has fallen on Professor Shattock, with the assistance of Mr. Cecil Beadles, to whose services a high tribute is paid. When complete the collection will include the more representative specimens illustrating the severer forms of facial injury and the methods of plastic surgery selected by Major H. D. Gillies from the specimens preserved at Sidcup. Progress has also been made with the preparation of the Onodi collection recently presented to the College; the work is being carried on under the supervision of Mr. T. B. Layton, F.R.C.S., who has undertaken to investigate, describe, and catalogue the specimens. Professor Shattock reports that the large collection illustrating special pathology, which had been removed to the basement for safety during the war, has now been restored to the Museum and rearranged in a slightly modified way. Specimens recently added will be placed on view in one of the rooms of the Museum from October 9th to November 10th.

THE pressure of matter from the Annual Meeting of the Association compels us again this week to suspend the publication of the EPITOME.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

National Health Insurance Bill.—The Lords' amendments to the National Health Insurance Bill were considered in the House of Commons on July 26th and agreed to. These changes were of a small and technical kind.

Milk and Dairies (Amendment) Bill.—This measure, after being considered in Grand Committee, was taken on report in the Commons on July 28th, and was given third reading on August 1st. Very few changes were made from the text as originally presented, and as outlined in the BRITISH MEDICAL JOURNAL last week. On report on Clause 8, giving the Minister of Health power to make regulations to prevent danger to health from the importation of milk, words were added, at the instance of Sir Alfred Mond, to include in such power the right to make a regulation to prescribe the minimum percentages of milk fat and milk solids in dried or condensed milks.

Criminal Law Amendment Bill.—On report on the Criminal Law Amendment Bill on July 25th in the House of Commons, Clause II, laying down that reasonable belief that a girl is 16 years of age shall be no defence, was subjected to the following qualification: "Provided that in the case of a man 23 years of age or under, the presence of reasonable cause to believe that the girl was over 16 years of age shall be a valid defence on the first occasion on which he is charged with an offence under this section." This addition was adopted by 99 votes to 65. The understanding was that it represented an arrangement between some members who supported the bill and some who were critical of it. On the second reading in the Lords, on July 27th, the Bishop of London, on behalf of those who introduced a similar bill last year, accepted the change. The bill had third reading in the Lords on July 31st.

The Sale of Arsenic.—Dr. McDonald asked, on July 26th, if, in view of the fact that large quantities of arsenic could be obtained from chemists by individuals merely signing a poison book, the

Minister of Health would take steps to discontinue this practice. Sir A. Mond replied that the sale of arsenic was governed by Sections 1 and 2 of the Arsenic Act, 1851, and by Section 17 of the Pharmacy Act, 1868. It would require further legislation, which would be considered, to deal with the point raised.

Voluntary Boarders in Mental Institutions.—Sir A. Mond informed Mr. R. Richardson, on July 26th, that during the year 1921 315 voluntary boarders entered licensed houses and 330 entered registered hospitals. During that year 194 voluntary boarders left licensed houses and 227 left registered hospitals of their own accord. Unless a patient was suffering from mental disorder of so acute a character that he was unable to appreciate what was taking place it was practically impossible for him to be certified without his knowledge, as had been suggested by the hon. member.

Mental Service Cases.—Captain Loseby asked, on July 19th, whether the Minister of Pensions was aware that many ex-soldiers of good social position, and in no sense dangerous, who owed their state entirely to service during the war, were still confined in pauper lunatic asylums? Mr. Macpherson replied that both ex-service and civilian patients in mental asylums and elsewhere differed in social status. Some of them, though neither dangerous to others nor actually suicidal, were quite unable, on account of their unfortunate mental condition, to look after themselves, and could not otherwise be suitably cared for. Service patients were on the legal footing of private patients, and might therefore be removed at the instance of their responsible relatives unless the medical superintendent certified that they were dangerous to themselves or others. In reply to a further question, Major Tryon stated, on July 20th, that the lowest rate paid for the maintenance of an officer whose admission to an asylum had been arranged by the Ministry was 2 guineas a week. There were in addition seven officers in country and borough asylums at rates ranging from 28s. 10d. to 37s. a week. None of these cases had been placed in the asylum by arrangement with the Ministry, but were allowed to remain there for various reasons. The average cost of maintenance of a service patient in asylums in England and Wales was about 36s. a week. Mr. Macpherson stated, on July 20th, that the number of ex-service men of all classes under treatment in asylums, in respect of whom allowances are paid or credited was 6,800.

Ex-Service Men under Care.—In reply to Captain Loseby, on July 25th, Major Tryon said that when the condition of a patient in one of the Ministry Neurological Hospitals deteriorated towards insanity he was kept apart from the other patients, and every approved means of cure known to modern science was tried. Should the treatment fail to arrest the development of the malady and certification became necessary, steps were at once taken for the patient's removal to a mental institution approved by the Board of Control.

Soldier Homes and Hospitals in Malta.—Sir J. Randles asked, on July 26th, what steps had been taken to give security to those responsible for soldiers' homes, hospitals, seamen's rests, and such buildings as had been erected on lands held from the War Department in Malta, but which, under recent arbitration, were liable to be disturbed by the civil authorities. Mr. Churchill said the responsible government at Malta might be trusted to deal with the authorities in charge of these institutions in an equitable spirit. He would forward the question and answer to the Governor of Malta.

Prevention of Conception.—Mr. Hailwood asked, on August 1st, whether the Government intended to introduce legislation on the lines of the French law of 1920 making it a punishable offence to publish or distribute books or pamphlets advocating or teaching the prevention of conception, or offering for sale or advertising the sale of articles designed for the like purpose. The Home Secretary said that it was the duty of the police to take proceedings in any case where books of an obscene character were being circulated, but it could not be assumed that a court would hold a book to be obscene merely because it dealt with the subject referred to. There was no present intention of introducing legislation.

Brief Notes.

Major Tryon has stated that the recent resignation of one of the speech specialists employed at the London Neurological Clinic, Kensington, brought about a temporary congestion of the work, but steps had been taken to deal with the situation, and there was no reason to doubt that they would prove satisfactory.

In reply to Dr. McDonald, on July 26th, the Minister of Health said that he was satisfied from inquiries made that cocaine was essential to the medical profession, particularly in ophthalmic surgery and laryngology. Although dental surgeons were not unanimous, many regarded cocaine as essential for certain operations.

Sir A. Mond stated, in answer to Mr. Mills on July 27th, that Sir Wilmot Herringham was appointed a member of the General Nursing Council on the nomination of the Board of Education.

The Secretary of State for War has stated that the department for compiling statistics of disease in the army during the war has to deal with thirty million hospital cards; delay was therefore inevitable, and this explained why statistics as to small-pox cases and deaths had not yet been issued.

A man's eligibility for pension is not affected by his removal from duty on one or more occasions, except in so far as it may afford evidence of the existence of the disability, and thus help to establish connexion between the disability and military service.

The Home Secretary has stated that the practicability of employing distinctive colours for poisons such as arsenic and strychnine is under consideration.

England and Wales.

Welsh National School of Medicine.

The Committee of Management of the Examining Board in England of the Royal College of Physicians of London and the Royal College of Surgeons of England has made a report on the application from the Welsh National School of Medicine to be recognized for the complete curriculum. The Committee discussed various points arising out of the application with a deputation from the University of Wales, consisting of Lord Kenyon, Pro-Chancellor, Chairman of the Board of Medicine, Principal A. H. Trow, Sir William J. Thomas, Bt., Sir William H. Diamond, Mr. D. W. Evans, Professor A. M. Kennedy, Professor Ewen J. Maclean, and Professor A. W. Sheen. The Committee was generally satisfied with the provision made for teaching, and the Royal Colleges have resolved:

That the Welsh National School of Medicine be recognized provisionally for the complete curriculum from October 1st, 1922, for one year, and that provided the following conditions are fulfilled not later than October 1st, 1923, such recognition become permanent, namely:

1. The total number of beds, exclusive of cots, available for the teaching of medicine in King Edward VII Hospital, Cardiff, shall not be less than 80.
2. Of these 80 beds, not less than 30 shall be allotted to the professor of the medical unit.
3. All physicians, surgeons, assistant physicians, assistant surgeons, and physicians and surgeons in charge of special departments at King Edward VII Hospital shall be recognized as teachers of the University of Wales.
4. Clinical clerkships and dresserships shall be provided for all students in professorial and non-professorial units.
5. Courses of instruction in all special departments required by the Regulations of the Examining Board in England shall be provided.

Cardigan Memorial Hospital.

The people of Cardigan and adjacent districts resolved that the local memorial to men who had fallen in the war should take the form of a hospital in Cardigan, to serve the neighbouring districts of Cardiganshire, Pembrokeshire, and Carmarthenshire, for the town stands near the point where these three counties meet. A considerable sum of money was collected and the committee was able to command the enthusiastic help of Sir John Lynn-Thomas, who, since his retirement from the active staff of King Edward VII Hospital in Cardiff, has gone to reside permanently at a short distance from Cardigan. At his suggestion Cardigan Priory, a private house standing in its own grounds just outside Cardigan, was purchased, and under his supervision and with generous help from him has been fitted up as a hospital, possessing all the facilities and appliances necessary for surgical as well as medical work. He has become consulting surgeon to the hospital, as has also Mr. J. O. D. Wade of Cardiff, while Dr. Arbour Stephens of Cardiff has become consulting physician. The staff of the hospital consists of practitioners resident in the neighbourhood.

The hospital was formally opened on July 28th by Dame Margaret Lloyd George, D.B.E. She was received at the Cardigan Public Buildings, and a procession was formed to the hospital. Mrs. Lloyd George having opened the main door of the hospital with a silver key presented to her by Lady Welby-Parry-Pryse, president of the hospital committee, a meeting was held under the presidency of Alderman John Evans, chairman of the Memorial Committee. Mrs. Lloyd George congratulated Cardigan and the district on having chosen so practical a form of war memorial; such hospitals, she said, were greatly needed in Wales, and she was glad to know that they were being established in other districts also. Sir Robert Jones of Liverpool, who followed, spoke on the importance of preventive surgery, and said that there need hardly be a cripple in the country if all did their duty. Very rarely indeed should a pair of crutches be seen, and there was no cripple whose condition could not be ameliorated if he could have the advantage of sound surgical treatment. Sir Charles Ruthen, Director-General of Housing, expressed the view that much disease was due to bad housing conditions, and that if people could have better houses hospitals would become unnecessary. Sir John Lynn-Thomas, who spoke next, traversed this opinion; while admitting that tuberculosis might be enormously diminished if houses were better, there were, he said, other serious diseases due to quite different causes;

he instanced appendicitis, which was to be attributed to imperfect teeth. Dr. Arbour Stephens, who also spoke, dwelt on the means which could prove effective for the prevention of heart disease. A vote of thanks to Mrs. Lloyd George was proposed by the Lord Lieutenant of the County and duly acknowledged. The Chairman announced that Sir John Lynn-Thomas had presented the institution with radium which in pre-war days was of the value of £200. A cordial vote of thanks was passed to him for this gift and for the large share he had taken in the establishment of the hospital. The hospital has been started on a modest scale, but the number of beds can easily be increased, and already, we understand, many applications for admission have been received and a number of serious operations successful performed.

MILK PROSECUTIONS.

Medical officers of health and others concerned with public health administration will read with some astonishment circular No. 325 issued by the Minister of Health on July 17th to authorities concerned in the Sale of Food and Drugs Acts.

The circular commences by stating that the attention of the Minister has been called to a case in which a milk vendor was prosecuted for selling milk deficient in fat; the vendor had previously held a good record, and on it being proved that special circumstances existed to account for the fat deficiency on this occasion the local authority withdrew the prosecution. The circular goes on to state that the Minister

"is advised that conditions of a purely temporary character may on occasion cause the milk from cows, which normally give milk of the proper fat content, to be below the limit laid down in the Sale of Milk Regulations, and that the results of an isolated test cannot be regarded as conclusive evidence that the milk in question is in general below this limit. The Minister is therefore of opinion that it is extremely undesirable that a prosecution should be based upon the results of an isolated test when other tests of the particular milk supply have proved satisfactory." It is suggested to local authorities that in the cases of "those vendors who are doing their best to secure that the milk they sell is of good quality," as judged by previous tests, prosecutions should be instituted only where a series of tests have shown repeated default.

This circular, provided attention is paid to it by efficient local authorities, which is, perhaps, doubtful, would virtually effect on this subject a change in the law by means of administrative action. The milk purveyor would have to be proved to the satisfaction of the local authority to be a systematic adulterator before proceedings could be taken against him. The circular does not state in what way it would be possible to make the evidence admissible so as to be able to prove in court the results of the repeated preliminary tests, taken formally or informally. Samples of milk are usually taken from purveyors at irregular and often at infrequent intervals, sometimes not more than once a year or even longer. Sometimes a considerable interval is allowed to elapse even after an adulterated or suspicious sample is discovered, before again testing the vendor's milk. Under the suggested procedure the purveyor would be protected if a first sample was reported to be not genuine and this protection would continue even if a second and possibly a third sample were taken within a reasonable time after the first sample and had yielded similarly unsatisfactory results. The existing law is that if anyone sells an article of food to the prejudice of the purchaser which is not of the nature, substance, and quality of the article demanded, he has committed an offence for which he is liable to be prosecuted. Members of local authorities and their officers as a rule act reasonably, and although there is no legal obligation on them, prior to taking out a summons, to ascertain why the milk sample is below the presumptive standard, nor to require an explanation from the vendor as is provided under the Milk and Cream Regulations (dealing mainly with the addition of preservatives), in practice before a prosecution is ordered consideration is given to such a point as the amount of adulteration, and to any circumstances bearing on the matter which may be known. It is a fairly common practice to take an "appeal to the cow," that is to say, a specimen is taken by the sampling officer at the farm with due precaution so that what he secures is a specimen of the milk which ordinarily should be dispatched from the farm. It is not customary to order prosecution for low amounts of adulteration; a caution is usually given. This often arises where "toning" is practised, and sometimes the vendor "overtones"—that is, he lets down the strength of his milk below the limits of 3 per cent. fat and 8.5 per cent. solids not fat laid down in the Sale of Milk Regulations. Below these limits the milk is deemed not to be genuine unless the contrary is proved.

In general it might be thought that some local authorities do not prosecute sufficiently often in milk cases, which is quite contrary to the suggestion of the circular. In the present state of the law on the subject, however, local authorities can hardly be blamed if often they refrain from instituting legal proceedings. According to the appeal cases decided in the High Court, any fluid proved to have been derived from the udder of the cow which appears to be milk is, legally speaking, milk, no matter how the cowkeeper has mismanaged his herd or what is the chemical composition of the fluid purporting to be milk.

The question of variations in the amount of fat in genuine milk is one which does not here arise; it depends upon a number of factors, but it is held that the mixed milk of a herd properly managed practically never falls below the low limits laid down in the Sale of Milk Regulations, 1901 (which after taking into account the above considerations were issued by the Board of Agriculture and Fisheries, a body which has little concern with the interests of the consumer, but in this matter has always been regarded as acting as the friend of the farmer), but if such milk did fall below these limits a satisfactory explanation could be furnished which would rebut the presumption that the milk had been adulterated; in other words, the producer already has ample legal protection according to the cases decided in the High Court.

Among the causes of fat deficiency in milk, most of which are within the control of the cowkeeper or milk vendor, may be mentioned "toning," irregular intervals between milkings, defective or improper feeding, breeding of cows for quantity of milk and not for quality, keeping the "strippings" (the after-milk, which is the richest) for the calves, and illness of the cows. Even if existence of any of these conditions can be proved (except "toning") the cow is held to be producing what legally is considered to be milk, whatever its composition. The defendant merely has to prove that the milk is sold as it came from the cow. (Hunt *v.* Richardson (1916) 2 K.B. 446, 85 L.J.K.B. 1036; Grigg *v.* Smith (1918) 82 J.P.R. 2; Williams *v.* Rees (1918) L.G.R. 159; Scott *v.* Knowles (1918) 55 Sc.L.R. 167.)

A further protection to a milk seller who is not the producer of the milk is that he can buy it under a warranty, and having proved this there is a sufficient answer to the charge so far as he is concerned.

Taking all this into account, it might be considered that instead of endeavouring to place further obstacles in the way of successful prosecutions, Sir Alfred Mond might have introduced legislation to cover the points referred to above; a suggestion to this effect was in fact thrown out by Lord Reading, when Lord Chief Justice, in his judgement in Grigg *v.* Smith, in order to prevent milk from being sold with an undoubted deficiency of milk fat as compared with the usual amount owing to the farmer, the successful appellant in this case, having, it was admitted, kept the "strippings" for the calves.

It must be assumed that all these facts were at the disposal of the Minister of Health, and he must be aware of the great difficulties experienced by the public in obtaining a reliable milk which reaches a reasonable chemical standard. Measures taken to secure a clean and tubercle-free milk have nothing to do with the present issue which, though involving a chemical point, is none the less of considerable importance.

A statement has appeared in the press to the effect that protests against the circular in the daily papers have been made under a misapprehension. This explanation though unofficial is represented to have been derived from official sources, and is to the effect that the circular very clearly and definitely refers to a particular type of case—namely, that in which regular inspection has been made which revealed that normally the milk from that place was satisfactory. The explanation proceeds further to refer to premises which are under official supervision, apparently the small number of those from which Grade A and Grade A certified milk is produced.

A careful reading of the circular leaves the impression either that this statement is designed to explain away and withdraw from the retrograde policy advocated in the circular, or that the circular was drafted in such obscure terms that its real import was obvious only to those who issued it.

No doubt questions will be put to the Minister of Health in House of Commons as to the source of the advice upon which he authorized the issue of circular No. 325.

Post-Graduate Courses in London.

As has been already announced, a two weeks' post-graduate course in general medicine will be held under the auspices of the Fellowship of Medicine and Post-Graduate Medical Association from Monday, September 11th to Friday, September 22nd; the following hospitals will participate: Hospital for Consumption, Brompton, Hospital for Epilepsy and Paralysis, Bethlem Royal Hospital, National Hospital for Diseases of the Heart, Middlesex Hospital, St. George's Hospital, the Children's Clinic Western General Dispensary, and the Royal Eye Hospital. A syllabus giving full particulars can be obtained from the Secretary to the Fellowship at 1, Wimpole Street, W.1. A short course on common tropical diseases will be held at the School of Tropical Medicine, Endsleigh Gardens, in October next. It will consist of systematic lectures illustrated by clinical demonstrations on the pathology, symptoms, diagnosis, and treatment of the several diseases and their sequelae. Copies of a preliminary syllabus can be obtained from the Secretary to the Fellowship of Medicine, and the detailed programme will be issued later.

Central Midwives Board.

The Central Midwives Board met on July 27th, Sir Francis Champneys presiding, when a letter was received from the Manchester and Salford and District Branch of the National Council of Women forwarding the following resolution which had been passed by the Council:

> This Branch of the National Council of Women is convinced that the present training of midwives is entirely inadequate to fit them for the heavy responsibilities of their work, and urges upon the Central Midwives Board and the Ministry of Health the necessity for longer and more comprehensive training. It urges further that before making any such change careful investigations shall be made, in this and other countries, and the views of midwives and others in all branches of maternity and infant welfare work shall be considered.

The Board decided to take the resolution into consideration when the rules as to training are revised, and expressed the desire that any information at the disposal of the District Branch of the National Council of Women might be forwarded.

The following were approved as lecturers: A. C. Palmer, M.B., F.R.C.S., H. F. Parker, M.D., A. H. Richardson, M.B., F.R.C.S., and Miss Mabel G. Brodie, M.D.; Miss Lily A. Baker, M.B., was approved as a teacher. The Board recorded a vote of deep sympathy with the family of the late Sir Edward Malins, and its appreciation of the valuable services rendered by him as an examiner at the Birmingham centre.

Scotland.

Sir James Hodsdon.

Sir James Hodsdon, K.B.E., M.Ch., F.R.C.S.Edin., has, on the occasion of his retirement from the surgical staff of the Royal Infirmary, Edinburgh (he was senior surgeon) received a presentation from his old residents. It took the form of silver plate reproducing some of the vessels found at Traprain Law. Sir James Hodsdon was President of the Royal College of Surgeons of Edinburgh from 1914 to 1917, and represents that college on the General Medical Council.

Laws of Livingstonia.

On the morning of Friday, July 28th, more than a hundred friends sat down at breakfast in Edinburgh with Dr. Robert Laws, who is returning to his work as a medical missionary in Central Africa. It is forty-seven years since Dr. Laws went out to Lake Nyasa to establish there a mission in memory of Dr. Livingstone, and the history of that work so successfully accomplished and of the man who has been mainly instrumental in accomplishing it have been published within the past few months in the book entitled *Laws of Livingstonia*. During his visits home at rather long intervals Dr. Laws has always endeavoured to bring himself abreast with all recent work in medicine, and during the past winter session he was to be seen climbing the stairs with the other students to the pathology department in the University of Edinburgh to the study of tropical diseases. At the age of 71 there is something almost heroic in facing student life and in going back to work in Central Africa; but Dr. Laws has accomplished so many great things in his adventurous, pioneering, and devoted life that possibly he may not think so. At any rate he gave no hint of weariness or weakness at the breakfast, where he was surrounded by many old and new friends. Whilst the majority of the guests were members of the various churches and of missionary societies, the medical profession was represented by Sir James O. Affleck, Dr. J. W. Ballantyne, and Dr. Robert Thin. Dr. Laws, in addition to holding the degree of M.D., is D.D. and F.R.G.S.

New South Wales.

Sydney University Commemoration.

It was decided by the Senate of the University of Sydney and the Professorial Board that the proceedings in connexion with the annual commemoration should this year be spread over two days. In the Great Hall at 11 a.m. on May 18th there was the annual commemoration of benefactors of the University, and degrees were conferred. In the afternoon there was held on the Sports Oval the 'Varsity championship sports in the presence of the Governor-General and his Staff. In the evening there was a conversazione in the Great Hall, the guests being received by the Chancellor, Sir William Cullen, and Lady Cullen. On May 19th the students had a procession of humorous "side shows" through the city to the University, where it was inspected by His Excellency the State Governor, Sir Walter Davidson. Association Students' song in the Quadrange and a mock trial under the auspices of the Law School were held in the afternoon. At 4.30 lectures were given by Professor Griffith Taylor on native races in Australia, by Dr. Lovell on the modern theory of dreams, and Professor Fawsitt on catalysis; at 5.30 a farce was given by undergraduates in the Great Hall; and from 7.30 to 10.30 there was dancing in the Union Hall and in the Engineering School, and a concert. There has been a great fall in the number of new entries at the Medical School, only about 86 new students this year, as compared with over 240 a year ago. The fall is attributed partly to the increase in the fees, partly to the lengthening of the course, and partly to a general recognition that the profession is already overcrowded.

Tropical Australia.

Some interesting evidence was recently given before the Commonwealth Public Works Commission which is at present considering the question of the north-south railway. Professor Priestley, the professor of chemical physiology in the University of Sydney, stated that he had lived in the tropics of Australia for some years, while he was at work in the Institute of Tropical Diseases in Townsville, and that so far there is nothing to show any deterioration of health through living in the tropical climate of Australia. Investigations, particularly with children of from seven to fourteen years of age, yielded no evidence of any sort of physical deterioration: the subjects examined compared favourably with those of any other part of Australia. Although there was a noticeable pallor in the skin, examination of the blood did not reveal a special anaemic condition. There was, however, no doubt that, particularly among women, the skin becomes much coarser in the tropics. Women living in the tropics have to work under very unfavourable conditions, housing is bad, kitchens are frequently built entirely of galvanized iron, and domestic help is extremely hard to get and very expensive. Nearly all the tropical diseases found in other countries were absent, though at isolated places there was a little malaria. Professor Priestley further stated that he had examined up to the third generation of children born in the tropics and had found no signs of deterioration in them; during the war he had examined recruits from Central Australia and found them to be a fine body of men.

Bubonic Plague.

At a recent meeting of the members of the Sydney Division of the Public Health Association of Australia Dr. W. G. Armstrong, the Director-General of Public Health, stated that the worst danger of the plague, so far as New South Wales is concerned, is passed for the season, but there is serious danger of a virulent recrudescence during the next summer months unless all possible preventive measures are taken in the interval. He said that it had been definitely determined that the plague was spread mainly by two kinds of fleas—the rat flea of cold countries and the rat flea of hot countries.

The progress of the epidemic in India, and on previous occasions in New South Wales, had shown that there was a marked tendency for these fleas to die off during the cold weather, and they could therefore assume, with reasonable probability, that Sydney had at present passed the most critical period of the disease. The team work of the Block Associations had been one of the most remarkable examples of the help the people as a whole could give to the public health officials that he had ever experienced. Precautionary measures, however, must not be relaxed for a day during the coming months; not only in the way of eradication of rats, but by united efforts to render the offices and warehouses of the city rat-proof. Dr. Harvey Sutton, the City Health Officer, said one good result of the present preventive campaign was that it sought the co-operation of all sections of the community, from the architect who designed rat-proof houses to the housewife who kept her place clean and so deprived the rats of food. Dr. R. Dick, Senior Medical Officer to the Board of Health, urged the importance of making every effort to prevent the spread of the plague-infected rats to the country towns, where food was plentiful and the destruction of rats very difficult owing to the rank growth of vegetation. The danger of plague throughout the country had increased very much in recent years owing to the fact that New South Wales had become a large wheat-growing State, and so that there was always plenty of food for rats and mice. Professor J. D. Stewart, Professor of Veterinary Surgery in the University of Sydney, said that so many diseases affecting human beings were carried by rats and mice or their parasites that man for his own protection, quite apart from the damage done to property, should wage incessant warfare against these animals.

"CLEAN THE CITY CAMPAIGN."

A "Clean the City Campaign" was recently organized by the United Block Association with a view to enlisting the full sympathy and efforts of the citizens in getting rid of rats, fleas, and dirt. In a series of practical suggestions issued by the United Block Association, emphasis is laid on the necessity of ridding the city of rats and fleas, and it is pointed out that this can be done only by killing the rats and by getting rid of all accumulations of dirt and garbage, either of the home or of the office, which give harbour to rats. The work could be facilitated by covering up all fragments of food so as to starve the rats, and by closing up the cisterns so that the rats could not get water. All fowl runs should be cleaned out and all garden refuse destroyed.

At a meeting of women, convened by the National Council of Women at the request of the Citizens' Block Association, to discuss the prevention of the spread of the plague, a large number of institutions were represented. Dr. K. A. Bryce spoke of sanitary methods of dealing with garbage. Dr. Grace Boelke complained that there were not enough health officers, and suggested the appointment of women to carry out health work. She urged the importance of attention to the tourist resorts, so that food and rubbish were not left lying about. It was eventually decided to appoint a subcommittee to go into the questions of forming Block Associations in the city and suburbs, and of giving health lectures in the poor and crowded parts of the metropolis.

At a large and representative meeting of business men to consider the best means which should be adopted to organize a thorough clean-up of the city, the Lord Mayor, who was in the chair, thanked the business men of Sydney for the promptitude with which they had responded to his appeal. He stated that the city had been divided into twenty-eight blocks, and already twenty associations had been formed. Dr. Armstrong, Director-General of Public Health, said the Board of Health was grateful to the business men for their energetic co-operation in regard to rat destruction, but he wished to emphasize the fact that for many years to come the danger of a plague outbreak would persist, and that the organization of the city into blocks could not be merely a temporary measure of protection. In case of any rat-infested premises coming under the notice of the Block Association, if the owner refused to do anything to rid them of the rats, the Health Department or the City Council would take the necessary action to compel him to do so.

During the campaign week many meetings were held and lectures and addresses were delivered in the city and suburbs. In addition the active sympathy of the clergy was enlisted, and special attention was directed in many of the churches to the important matters of health.

Correspondence.

THE CAUSE OF INFLUENZA.

SIR,—I was particularly interested in your *précis* of Professor McIntosh's report on influenza to the Medical Research Council which you publish in the JOURNAL for July 22nd, 1922 (p. 137), because I had come to the same conclusions as his three years ago (BRITISH MEDICAL JOURNAL, March 1st, 1919). There is one piece of evidence not available in a laboratory which he leaves out, and that is the prevention and rapid cure (abortion) of the disease with a pure antigen of the bacillus. You say in criticism that the influenza bacillus appears in human beings apart from influenza. This is not my experience. I have never known a case harbouring the influenza bacillus that had not had an attack of influenza, and was therefore a carrier, or had been in contact with a case. In my laboratory the medium used for ten years—namely, unheated human blood agar, for growing all microbes for antigen purposes will always grow the influenza bacillus provided it is alive in the material, and, therefore, it is very striking that we never saw the influenza bacillus until the pandemic in 1918, and since then it appears with the epidemics and disappears with them.

As to the special filter-passing microbe, I hope we are getting away from the idea that filter passing is solely the property of a special class of ultra-microscopic microbes that never can become large enough to be seen. Probably very many microbes, if grown under suitable conditions, can become small enough to pass through filters. This has indeed been proved. Moreover, filters vary in the size of their pores, and some of them have cracks. Finally, we must seek postulates other than Koch's for the identification of the infectivity of at least 90 per cent. of human infections since the crucial experiment—namely, the infection of other human beings with the isolated organism—is not open to us.

I have suggested as a beginning that:

1. If the microbe is an epidemic one and the disease is prevented and aborted with a pure antigen of the microbe, that microbe is the cause of the epidemic. These criteria have been satisfied by the influenza bacillus and by a new microbe I have recently isolated—namely, that of fowl diphtheria very similar to it. And also, of course, by the *B. typhosus* and *paratyphosi*.

2. If the microbe is causing a definite lesion in the body, such as Bright's disease or encephalitis lethargica (BRITISH MEDICAL JOURNAL, March, 1920, and April, 1921), and a pure antigen produces a focal reaction at the site of infection, then that microbe is the cause of the disease if the infection is a pure one or one of the causes if the infection is a mixed one.

—I am, etc.,

W. M. CROFTON,
Laboratory of Special Pathology,
University College, Dublin.

July 25th.

VOLUNTARY v. STATE HOSPITALS.

SIR,—The attitude adopted by the British Medical Association at their Glasgow Meeting in regard to the question of voluntary hospitals is one that should commend itself to every member and non-member of the Association; it is a question that seriously concerns not only them but the entire population of the United Kingdom. Those who can appreciate the great privileges connected with voluntary hospitals as opposed to State hospitals, and the overwhelming advantages of an independent medical profession, would bitterly lament the introduction of State hospitals and a State medical service. Once the State has to budget regularly for the support of the hospitals of the country, even if its allotments are not very material, it can legitimately claim to have something to do with their administration and organization. This is the initial stage—the insertion of the thin edge of the wedge; the next step will be the conversion of these institutions into State or national hospitals, and their medical and surgical staffs will become part of a State medical service. In my opinion this conversion of hospitals and the creation of a State medical service would be one of the most fatal blows that could be given to the progress of hospital administration and work and to the independence of opinion of the most talented medical men in the kingdom. I believe it is only medical men, who have been bound by the four corners of a series of "red books" for the greater part of a lifetime, who know how to value reasonable freedom of action and

liberty of personal opinion in professional matters. A State medical service, which must have some sort of definite policy, has to control within certain limits the published opinions of its officers. One of my functions as D.D.M.S., Army Headquarters in India, was to censor the papers which medical officers in military employ submitted for approval by the D.M.S. before they appeared in the medical press (articles for the lay press were, of course, subject to the rules laid down in the *King's Regulations*). It was seldom that we had to make any suggestions, but occasionally young and ambitious men, from lack of experience or other reason, went off the rails. One naturally admired initiative, personality, and independence, and fostered them when these did not clash with official considerations, and one felt it to be a serious matter to damp the ardour of a possible budding genius; in short, some sort of control is indispensable in a State service. Similarly, once State hospitals are introduced every article of their equipment must, for uniformity and convenience of supply, be scheduled, and practically everything required not on the list can only be procured after obtaining special sanction, which may take months or may be withheld. As a regimental medical officer I had to buy my own wash-hand basin for personal use, as only one was allowed for the whole hospital, and for fifteen years I had to purchase my own nail brushes because they were not included in the list of authorized articles.

State hospitals mean stagnation in progress in hospital work; a State medical service means suppression of initiative, personality, and independence; with both these factors the interests of the public are inseparably connected.

The public, and especially the classes for whose benefit voluntary hospitals exist, should, however, fully realize their personal responsibilities; if they are to continue the free use of these institutions and to have the very high standard of medical and surgical treatment obtained in them, they must provide the working expenses. Every person in the kingdom should pay something towards the upkeep of these hospitals. Those who cannot afford more should pay even a few shillings a year to their local hospital fund. Every practising medical man should avail himself of every opportunity of representing this duty to the people of the community in which he works. If the people do not meet the expenses connected with voluntary hospitals the change apprehended will, it is all but morally certain, become inevitable.—I am, etc.,

P. HEHIR,
Major-General I.M.S.

Westward Ho, July 23th.

THE TEACHING OF PSYCHOTHERAPY.

SIR,—I wish to point out one or two possible fallacies in Dr. Macdonald Ladell's letter on this subject (p. 191). He rightly states that the remedy for lack of appreciation of psychotherapy lies in the education of the profession in its scope and usefulness, but goes on to say that this can only be done by teaching psychotherapy itself. Surely a more effective method is, as in the case of operative surgery, to let the practitioner see the patient before and after treatment. Dr. Ladell suggests that the specialty of psychotherapy should be looked at from the same angle as a surgical operation. But this is already done, and in the case of a fully qualified specialist the general practitioner is usually willing to let the case go out of his hands for a long time. Naturally, however, as the issue involved is in its way often no less serious than that involved in an operation, the medical attendant hesitates unless he has evidence that the specialist is as well qualified as the operating surgeon. In the case of the latter this is generally shown by the possession of a higher diploma and a hospital post at which good work is done. For a psychotherapeutist similar qualifications are not usually possible, nor are they desirable. But he should produce evidence of similar long training; he must go through a full analysis at the hands of a competent analyst, or adopt some equally satisfactory course. In addition he should study some or all of the allied subjects—neurology, insanity, and mental defect—and much else besides. This involves time, expense, and hard work.

Dr. Ladell recognizes that analysis cannot be taught before a crowd of students, but his suggestion that some half-dozen keen spirits should work systematically at the interpretation of their own dreams under the guidance of a lecturer does not offer a solution. The situations, and therefore also the dreams, dealt with in analysis are extraordinarily delicate and individual, and cannot be discussed profitably with anyone except the analyst. The six students working with their lecturer inevitably make the work machine-like and therefore valueless. They are not likely to shed any light on those problems of dreams which are still obscure. Certain typical dreams can be explained in a lecture, but no one can learn analysis from lectures, but only by living through the psychological experiences, emotions, and gradual enlightenment his patients must face later. Dr. Ladell seems to suggest that psychotherapy is now a science; analysis, however, never can become a science any more than the differences between the schools of Freud and Jung can be reconciled; some of these are fundamental, and not mere differences of technique.

In conclusion, I would agree with your article in the issue of July 15th that whenever possible specialists in psychotherapy should only accept patients through a general practitioner; if this is done they will not have to complain of the lack of recognition they get either from the public or their own profession.—I am, etc.,

W. A. POTTS.

Birmingham, July 29th.

SIR,—I have been interested in Dr. R. Macdonald Ladell's letter on the teaching of psychotherapy. At the Tavistock clinic for functional nerve cases we naturally encounter the difficulties to which he refers, and our attempt to meet them has been on the following lines. If the practitioner who desires instruction in psychotherapy lives near at hand, and is in practice, we get him to attend a three months' course of lectures and suggest a course of reading for him. If at the end of that time his enthusiasm shows no signs of waning, we suggest that he should be analysed, either by a member of the staff or by some other analyst. It then becomes the duty of the analyst to say when he may begin treating other cases. He then starts with one or two cases, of which a provisional diagnosis has already been made by a senior member of the staff. He is expected to devote not less than two hours weekly to each case, and he has a weekly interview with me or with one of my colleagues to talk over his cases and discuss his difficulties.

When the practitioner has only a limited period of, say, three months at his disposal, as in the case of colonials, I.M.S. men on furlough, etc., the procedure has necessarily to be compressed, and not infrequently we postpone the practical part of the training to a subsequent furlough.

The main difficulty is to side-track without offence the enthusiasm of those who, in their ignorance, believe that in the course of a week or two they can acquire the technique of hypnotism, and with this equipment return to work as psychotherapists.—I am, etc.,

H. CRICHTON MILLER.

London, July 31st.

THE PREVENTION OF SIMPLE GOITRE.

SIR,—The article on simple goitre by McCarrison in the BRITISH MEDICAL JOURNAL, April 22nd, 1922, and the note on the prevention of goitre in the *Medical Officer* for July 8th raise a question which medical men cannot honourably allow to remain unanswered.

We are given to understand that simple goitre is the easiest of all known diseases to prevent, and the method of prevention—the exhibition of iodine—one that could be applied almost anywhere.

There are, of course, as McCarrison says, a number of factors that combine to render the available iodine in the food relatively insufficient—for example, age, sex, puberty, pregnancy, menstruation, season, infections and climate, food, altitude, distance from the sea, food balance (excess of fats increasing the need of iodine), etc., and in any particular case these matters would have to be taken into account; we would, for instance, deal with a contaminated water supply or prevent constipation and oral sepsis.

If goitre, then, can be prevented let us as a profession, laying aside any rivalry, enthusiastically initiate and carry on a preventive campaign.

To those of us in the public health and school medical service certain measures of dealing with the problem will occur. In my report on the school medical work in Bath for 1919 I gave details regarding the prevalence of goitre among school children and certain factors relevant thereto, and in an article in *School Hygiene* (November, 1920) I considered the

question generally. Regarding prevalence, I give an extract from my paper in *School Hygiene*:

"During the years 1918–19 notes were taken of various matters relating to this disorder and its prevalence among 7,025 school children in Bath. The cases were distributed as follows:

Ages.	Boys.		Girls.	
	Numbers.	Goitres.	Numbers.	Goitres.
Over 14 years ...	63	1	46	2
12–14 " ...	1,024	11	1,173	25
10–12 " ...	226	2	193	6
8–10 " ...	910	1	912	11
6–8 " ...	355	0	336	5
Under 6 " ...	891	0	818	6

"There was thus 0.50 per cent. among the 3,548 boys, and 1.50 per cent. among the 3,477 girls. The percentage became higher in the pre-pubescent period after ten, no cases were found in boys under eight, and none recorded on the 190 cards received by me from infant clinics.

"An appendix on the subject by Dr. A. C. Turner in Dr. Warner's report for Leicester, 1919, showed 1.8 per cent. among 11,244 children, distributed as 0.2 per cent. in girl entrants, 0.3 per cent. in boy entrants, and in leavers 5.8 girls and 1.1 per cent. of boys. Dr. Turner thought the incidence greater in well-favoured residential districts, and although for Bath I thought so too, I am not now convinced of this

"In one Bath school there appeared to be a special outbreak, with 15.7 per cent. among the girls, 4.3 per cent. among the boys, and 1.9 per cent. among the infants; of these cases 8 were below and 10 above ten years old, and the disease appeared to have come on fairly rapidly.

"As regards other districts, Dr. Hutt, in an article in the *Lancet* (April, 1911), gave an analysis of cases in Warrington, and quotes figures for Brighton as 0.8 per cent.; Exeter 0.3 boys and 2.4 girls, average 1.4 per cent.; Middleton 0.2 boys, 0.7 girls, average 0.45; Burton 0 6; Warrington 0.93 boys, 1.6 girls; Derbyshire 0 5 girls of five and 4.0 girls of thirteen, boys 0.2 at five and 1.0 per cent. at thirteen; Dr. Williams in Worcestershire gives 0.5 boys and 1.7 girls, average 1 1 per cent., among 4,603 children.

"On the other hand the *Medical Officer*, April 19th, 1919, quotes enlarged thyroid 56.0 per cent., and very definite enlargement 13.0 among school populations in the Great Lake Districts of North America. Dr. Sutton in Australia found 7.0 per cent. slight and 5.0 per cent. very definite enlargement among Geelong high school girls. McCarrison quotes districts of prevalence in India, whilst a medical friend of my own, Dr. Metcalfe Chambers, tells me that he has not seen a case among 28,000 Asiatic hospital patients in the Malay States. McCarrison only counts visible enlargement of the gland; palpable glands not visibly enlarged he does not include as goitrous."

Since writing the above I have found in Glossop (Derbyshire High Peak) that, taking boys and girls as a whole, the percentage among 1,222 was 2.1 as compared with 1.02 in Bath. The number of boys examined as compared with girls was in Bath 3,548 to 3,477, in Glossop 600 to 622.

These figures will give a fair idea of the extent of the problem as regards school children. Regarding the general population in 1919, diseases of the thyroid body caused the deaths of 39 males and 232 females. The female sex, therefore, is very much more prone to thyroidal disease than the male.

Coming now to the steps to be taken to prevent the disease, I think that as regards the school medical service the suggestion made by me in the article in *School Hygiene* should be generally adopted: "That school nurses who inspect for vermin should be specially instructed how to observe and note the thyroidal gland condition."

If this were carried out we would have roughly a quarterly survey of all the elementary school children as regards the condition of the thyroid; where the gland was noted to be enlarged or beginning to enlarge the details should be given to the school medical officer, who could see that preventive treatment was carried out. The school medical officer could then either through a clinic or by arrangement with all the general practitioners in his area have iodine therapy and other general hygienic and remedial measures employed. As the school medical service will, however, in most cases leave the child at the age of 14 years it will be necessary to arrange to cover the gap between this age and the age for national insurance; would it be possible for children who left school to be considered for the purpose of medical inspection and treatment to be still school children, and under the care of the Board of Education? This gap for many other matters as well as goitre is one that should be bridged.

On arriving at the age of national insurance the details of the defect could be handed on to the panel practitioner, who in his turn could carry treatment to a successful conclusion.

I put these suggestions forward for general consideration, and I sincerely trust it will be possible for some satisfactory arrangements to be devised whereby the population at large will reap the benefits of applied medical science.—I am, etc.,

E. H. MARCUS MILLIGAN, M.D., D.P.H.,
M.O.H. Glossop and Glossop-dale.

Glossop, July 10th.

A NOTE ON THE TREATMENT OF SQUINT.

SIR,—In the issue of the JOURNAL of January 7th, 1922, there is a note bearing the above title by Lieut.-Colonel Henry Smith, lately of Amritsar. In that note he cites one case of divergent squint in a child in which he considered he got some relief of the squint by puncture of the supposed weak muscle and the administration of repeated faradic shocks. The real condition of the child's eyes was unknown, for he admits inability to make the necessary examination. On the strength of this one experience of a divergent squint—a type of squint notoriously variable in degree according to the health and state of nervous tension of the patient—Colonel Smith recommends us to "shake ourselves free from all that has been done" by generations of assiduous workers for the development of a rational and successful treatment of squint. The recommendation is such that I should not have troubled you with any comment if Colonel Smith had not at the same time made a specific attack upon one method of operating for squint of which I have valuable experience.

He says: "Tendon tucking . . . stretches one of the muscles of the eye and introduces a factor which cannot be gauged. From the surgical point of view any cutting operation leaves scar tissue which is subsequently liable to contract, and none is more likely to do so than tendon tucking." Tendon tucking, he adds, "almost invariably means muscle tucking." In my own experience tendon tucking is practically reserved for the lateral rectus in dealing with convergent squint. The lateral rectus has 8.8 mm. of tendon, and it is this which is tucked and not the muscle itself. No operation for squint can be gauged with precision, but Harman's reefing operation can be gauged with more precision than most. The scar tissue in this operation is minimal, and none is less likely to contract subsequently than this.

Why Colonel Smith should have a particular prejudice against the tucking or reefing operation I do not know. I have been interested in and operating on squint for over twenty years. For the last ten I have done Bishop Harman's reefing operation combined with his method of lengthening the medial rectus, almost to the exclusion of all other procedures, and I am satisfied that it is the best and most satisfactory operation in the field at present. I hope later on to publish my results, which must now run into some hundreds.—I am, etc.,

E. C. TEMPLE SMITH, F.R.C.S.E., D.O.Oxon.,
Senior Ophthalmic Surgeon to the St. Vincent's Hospital and to the Royal Alexandra Hospital for Children,
Sydney, Australia.

May 23rd.

SERUM IN THE TREATMENT OF VELDT SORES.

SIR,—A few months ago a fellow medical man a day's journey off, who was suffering from veldt sores, asked me to come to his help. He wrote:

"In spite of trying every method of treatment I can think of they have not got better; indeed, they have increased both in size and numbers until now my buttocks are almost covered with these sores. I think the only rapid cure would be to have them scraped and cauterized under an anaesthetic."

On examination I found the condition had not been overstated. The only antidiphtheritic serum available was 5,000 units of some old Merck's stuff, which must have been brought here by the Germans before August, 1914, and was therefore about seven years old at least.

After discussing the matter it was decided to take the risk of a failure with this old serum, and I injected 4,000 units subcutaneously in the neighbourhood of the sores, using the little serum left to swab over the buttocks. The injections were received unmurmuringly, but the swabbing immediately set up an intense reaction, causing the patient to jump up and stamp up and down the room. Two weeks later he wrote:

"My veldt sores are entirely healed now. The effect of the treatment was wonderful. They commenced to improve on the third day and healed rapidly, until by the end of a week they were dry with healthy scabs on them."

There has been no recurrence, and abrasions which the patient alleges would previously have been certain to develop into veldt sores have all healed perfectly.

The chief point of interest here perhaps is that serum which had been lying about without special care for at least six years, and that in the tropics, and would not have been used at all if other serum had been available, still retained its potency.—I am, etc.,

Central East Africa, May 25th. DAVID M. BROWN.

EFFECTS OF CHRONIC STARVATION DURING THE SIEGE OF KUT.

SIR,—The following points may be of interest to those who have read General Hehir's article (June 3rd, p. 865). They were noted during the famine of 1897 in the Jubbulpore district.

Condition of the Bowels.—Specimens of the large and small intestines of patients dead of starvation were sent to the Clinical Research Association. A report was received that the glandular element had atrophied. It is probable that once the atrophy has reached a certain stage the specific structure is not again reproduced. This would account for the fact that after a certain stage of starvation has been reached recovery is impossible, even with appropriate food.

Critical Point of Starvation.—This occurred in people who were still able to stand and even walk feebly. In children it was signalled by atrophy of the buttocks. Those who showed this sign never recovered whatever their general condition was.

Unsuitable Diet.—This was the actual cause of death in a large number, probably the majority, of cases during the famine. True cholera was present throughout the famine area, but the fatal complaint in the relief camps was of a dysenteric type, not choleraic, and hopeless to treat.

Cancrum Oris.—This was a scourge amongst the children in the relief camps. It did not apparently occur amongst the adults in Kut, nor was it noted amongst the starved Turkish prisoners after the final overthrow of the Turks in Palestine and Syria in 1918.—I am, etc.,

Shillong, Assam, June 30th. W. H. OGILVIE, M.B., D.Sc., Colonel I.M.S.

THE NAVAL MEDICAL SERVICE.

SIR,—In your recent article on the subject of the injustice which has been inflicted by the Admiralty on a certain group of senior surgeon commanders, R.N., you very rightly warn intending candidates for the Naval Medical Service of the treatment they may expect if they join the navy.

It does not seem to be consistent with your warning to continue to publish Admiralty advertisements for surgeon lieutenants for short service, especially as the advertisement states these officers will be considered for transfer to the permanent service under certain conditions.

Including the equipment allowance the terms offered amount to £600 per annum, and may appear reasonable; but it must be remembered that the Admiralty could have kept on the senior surgeon commander at a cost of £440 per annum—the difference between their maximum full pay of £1,040 per annum and their retired pay of £600—and at a saving to the country of £160 per annum.

I trust the Association will see its way to discontinue inserting the advertisement, which in itself does not appear to be free from criticism; the period of service is stated to be three years, with option to extend for further twelve months, and this seems to be open to a possible Admiralty interpretation that the option is theirs to keep on an officer, against his will, over the three years if he is serving on a foreign station or for other reasons, and we know from recent experience the officer would have no remedy.—I am, etc.,

London, July 16th. A VICTIM.

TENDON TRANSPLANTATION.

SIR,—I am entirely in agreement with Mr. Fairbank when he points out in your issue of July 29th (p. 190) that in some cases in which hamstring muscles have been transplanted to the patella to replace a paralysed quadriceps some recovery has subsequently occurred in the quadriceps.

One of the cases which I demonstrated at the clinical lecture reported in your issue of July 15th showed a slight recovery in the quadriceps, as Dr. Mennell, who was present, pointed out to me. I have never seen this recovery amount to anything more than a flicker of muscular contraction, and it has not been sufficient, in any case which I have seen, to produce any appreciable extension of a flexed knee.—I am, etc.,

Manchester, July 31st. ROBERT OLLERENSHAW.

TOBACCO SMOKE AND CANCER.

SIR,—Referring to a letter on "Tobacco smoke and cancer" in your issue of July 8th, Dr. Abbe of New York, an eminent surgeon and a pioneer in the medical and surgical uses of radium and its properties, once told me he had never met with a case of malignant disease of the lips, tongue, mouth, or throat in a non-smoker or one who did not chew betel-nut or indulge in similar habits. Great numbers of cases of malignant disease passed through his hands.—I am, etc.,

London, W., July 16th. C. DUER, Lieut.-Col. I.M.S.(ret.).

BEER AND LEAD POISONING.

SIR,—Our attention has been directed to a paragraph on page 179 in your current number with regard to beer and lead poisoning. It is suggested that poisoning may result from the use of lead glaze in stoneware receptacles.

As far as we are aware, we are the only manufacturers of stoneware containers for this purpose, and no lead whatever is utilized in the glaze of these vessels. Should poisoning have resulted from beer used in such containers it cannot, therefore, be due to the reason suggested, but must arise from some other cause.

As prominence has been given to the paragraph we feel compelled, owing to the authoritative nature of your JOURNAL, to ask for a correction.—We are, etc.,

London, S.E., August 1st. DOULTON AND CO., LTD.

*** We understand that the apparatus referred to in the note last week was not made by Messrs. Doulton.

Universities and Colleges.

OXFORD AND CAMBRIDGE UNIVERSITY COMMISSIONS.

THE President of the Board of Education introduced into the House of Commons on July 24th a bill to carry into effect certain recommendations of the Royal Commission appointed to consider the applications made by the Universities of Oxford and Cambridge for financial assistance from Parliament. The Commission reported on March 24th, 1922: It conducted the greater part of its inquiry in two sections, one for Oxford and the other for Cambridge, and at each place inquired into the financial resources of the University and the colleges, the administration of these resources, the government of the University, and the relation of the University to the colleges. It advised that two statutory commissions should be appointed to carry out the changes in University and college statutes recommended by the Commissioners.

The bill now introduced constitutes two bodies of commissioners, the one for Oxford and the other for Cambridge; in each case the number of members is seven. In the Oxford Commission science, including medicine, is represented by Sir Archibald Garrod, K.C.M.G., M.D., F.R.S., Regius Professor of Medicine; in the Cambridge Commission by Sir Richard Glazebrook, K.C.B., D.Sc., F.R.S., formerly Director of the National Physical Laboratory, and Sir Hugh Kerr Anderson, M.D., F.R.S., formerly lecturer on physiology in the University and now Master of Gonville and Caius College. The bill proposes that the powers of the Commissioners shall continue in force until the end of 1924, though the period may be extended by the King in Council to the end of 1926.

The duty of the Commissioners in each case will be to make statutes and regulations for the University, its colleges and halls, and any other institutions in or connected with the University; and also with regard to emoluments, endowments, trusts, foundations, gifts, and offices. The statutes and regulations are to be made in accordance with the recommendations of the Royal Commission, but with such modifications as may, after the consideration of any representations made to the Commission, appear to it expedient. After the expiration of the powers of the Commissioners the universities and colleges will resume their normal powers of government. The statutes now to be established may be altered by statutes made by the universities, but in the case of statutes which affect a college only with the consent of the college. With the permission of the Privy Council colleges also may alter their statutes. It will be remembered that the Cambridge committee of the Royal Commission recommended that women should be admitted on the same conditions as men to membership of the University, but with certain limitations. This matter will therefore have to be considered by the Commission now proposed to be established.

UNIVERSITY OF LONDON.

UNIVERSITY COLLEGE.

THE following awards of medical scholarships and exhibitions have been made at University College, London: Bucknill scholarship of the value of 135 guineas, to R. L. Midgley. Medical entrance exhibitions of the value of 55 guineas each to E. H. Madge and V. Freeman.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.

THE following scholarships and prizes have been awarded:

First Prize (divided): W. R. F. Collis, W. I. Daggett. Senior Scholarship (divided): N. W. Snell and Miss C. P. Francis. Jelf Medal and Tanner Prize: L. Dulake. Todd Prize (divided): L. Dulake and Miss C. P. Francis. Class Prizes—Diseases of Children, Miss E. C. N. Paterson, D. Davidson (proxime accessit); Orthopedic Surgery, N. W. Snell; Medicine, L. Dulake; Surgery, W. P. Sheldon; Pathology, C. R. Lane; Obstetric Medicine, P. B. Atkinson; Forensic Medicine, A. C. T. Perkins; Hygiene, A. C. T. Perkins; Psychological Medicine, E. B. Strauss.

LONDON (ROYAL FREE HOSPITAL) SCHOOL OF MEDICINE FOR WOMEN.

The following scholarships have been awarded for session 1922-23:

Sir Owen Roberts's Memorial Scholarship: Miss D. Stewart (London School of Medicine for Women). St. Dunstan's Medical Exhibition: Miss M. H. Lester (Christ's Hospital). Mabel Sharman-Crawford Scholarship: Miss H. Newman (London School of Medicine for Women). Isabel Thorne Scholarship: Miss E. L. Hutton (Clergy Daughters' School, Casterton). Ellen Walker Bursary: Miss V. A. Roberts (London School of Medicine for Women). Fanny Butler Scholarship: Miss E. M. Oswald (Ridgelands College, Wimbledon).

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

AN ordinary comitia of the Royal College of Physicians of London was held on July 27th, the chair being occupied by Dr. Raymond Crawfurd, the senior Censor, in the absence of the President.

On the report of the Censors Board, and in accordance with By-law cxc, it was resolved:

1. That William Henry Starkie be declared to be no longer a licentiate of the College; that he forfeit all the rights and privileges of a licentiate; and that his name be expunged from the list of licentiates—during the pleasure of the College.
2. That John William Knaston be declared to be no longer a licentiate of the College; that he forfeit all rights and privileges of a licentiate; and that his name be expunged from the list of licentiates during the pleasure of the College; but that an application for restoration of his licence may be considered in two years from the date of the withdrawal thereof.

The following candidates were admitted Members:

Cyril Carlyle Beatty, M.B.Lond., L.R.C.P., Harold E. A. Boldero, M.B. Oxon., L.R.C.P., Harry A. Boyce, M.D.Ontario, Norman Brandon Capon, M.D.Liverpool, Francis Wm. Murray Cunningham, M.D. Edin., Jeuner Conway Davies, L.R.C.P., Oliver Charles Minty Davis, M.D.Bristol, Wm. Stovell Gross, M.B.Camb., L.R.C.P., Charles H. Kellaway, M.D.Melb., Christopher Amrita Shanta, M.B.Calcutta, Jehangir Munchershaw Surveyor, M.B.Calcutta, John Edwin Mackonochie Wigley, M.B.Melb., Harry George Everard Williams, M.D.Camb., L.R.C.P., Frederick Edward Saxby Willis, M.B.Lond., L.R.C.P.

Licences to practise Physic were granted to 115 candidates:

Licences.

S. Adler, N. A. Aiengar, J. V. D. Allin, G. W. Ballance, F. H. Bodman, P. W. Boobbyer, H. W. Briggs, G. L. Brocklehurst, *Gwendolen M. Brown, R. C. Brown, *Gladys L. Buckley, N. L. Capener, *Madeleine H. Clarke, E. A. Coldrey, L. B. Cole, R. H. Cooke, D. C. Corry, N. McL. Craig, P. P. Dalton, K. A. Darukhanawala, W. A. Date, T. H. R. Davies, F. D. Déjani, H. K. Denham, J. B. Devine, C. J. Donelan, L. Dulake, *Helen W. Duncan, *Beatrice E. Ebden, *Mary C. Elliot, D. C. Fairbairn, L. S. Fallis, A. R. Fox, *Christine P. Francis, W. F. Francis, C. B. S. Fuller, *Ada Furniss, H. J. J. Garrod, *Marie L. P. Goetze, *Alice M. F. Goldmann, S. Gordon, R. Hale-White, H. G. Hall, B. O. Hancock, T. H. J. Hargreaves, *Muriel M. Harris, S. G. Harrison, P. R. Hawe, *Hilda M. Haythornthwaite, E. C. Heap, M. M. Hegab, H. C. Hill, G. H. Hogben, J. P. Hosford, E. G. Housden, G. H. Howells, J. S. Hudson, E. N. Hughes, J. Jackson, A. E. Jenkins, A. J. Keavill, *Mary A. Keresztes, A. M. Khaleel, D. Levi, S. I. Levy, N. H. H. Longton, L. H. B. Macleod, A. C. Maconie, H. H. Marsden, P. de R. Mason, C. O. Minasian, H. J. Morris, D. C. Muir, H. A. Nathan, J. Ness-Walker, F. G. Nicholas, L. F. O'Shaughnessy, H. M. Palmer, D. H. Patey, F. Y. Pearson, R. C. Peate, G. Piotrowski, W. M. Ramsden, H. E. K. Reynolds, H. Richards, *Constance E. Ridout, S. D. Rieley, B. C. de S. Rupasingha, *Gladys M. Sandes, *Norah B. A. Sankey, Margaret C. Scrace, C. F. H. Sergeant, N. F. Shaw, *Patricia H. S. Shaw, C. M. Short, J. Shulman, N. W. Snell, J. A. Struthers, C. Sturton, F. B. Sudbury, M. H. Summers, D. B. Sutton, H. W. Taylor, H. R. J. Thomas, T. M. Thomas, H. K. Tucker, H. D. A. Utidjian, R. H. Wade, H. K. Wallace, J. Whitby, *Catherine M. Williams, C. P. Wilson, G. Wilson, D. A. Windemer, J. A. Young.

* Under the Medical Act, 1876.

Diplomas.

Diplomas in the subjects indicated were granted in conjunction with the Royal College of Surgeons to the following candidates:

PUBLIC HEALTH.—J. E. Bowen, D. S. Brachman, B. C. Dasgupta, P. Davies, A. M. El-Kirdany, R. F. Fagan, C. H. H. Harold, P. A. Hayne, F. B. Hobbs, C. B. Hogg, A. E. Ironside, Doris E. P. Jolly, B. L. Joshi, G. J. W. McMichael, M. C. Madhoc, J. Misquitta, W. Oats, G. R. Painton, Barbara Richardson, J. P. Rosha, A. D. Soares, Ruth C. Townshend, J. R. D. Webb, H. G. Wiltshire, F. H. Young.

TROPICAL MEDICINE AND HYGIENE.—B. F. Beatson, H. C. Berlie, Nancy E. Bleakley, C. V. Boland, D. I. Cameron, V. M. Fisher, P. Gupta, S. Hunt, H. S. Lucraft, G. S. Marshall, L. M. Moody, E. R. Kellersberger, M. Schwartz, M. Theiler, S. M. Vassallo, M. Yacob, Margaret H. R. Young.

OPHTHALMIC MEDICINE AND SURGERY.—D. P. Bhargava, J. C. Bharucha, R. E. Collins, E. MacA. G. Glassford, R. McM. Glynn, N. McA. Gregg, A. J. Kapasi, K. E. Madan, Gladys H. Marchant, J. S. Monro, B. B. Nanavati, C. C. O'Malley, S. Scoular, F. J. D. Twigg.

PSYCHOLOGICAL MEDICINE.—J. Bostock, J. J. Gasperine, H. H. P. Morton, N. Navarra, F. X. Noronha, F. Paine, E. C. Rayner, C. H. L. Rixon, K. M. Rodger.

The Examiners for the Murchison Memorial Scholarship reported that Arthur Henry Douthwaite and Charles Frederick Terence East were equally deserving of the Scholarship.

College officers, members of committees, and examiners for the ensuing year were elected on the nomination of the President, Council, and Library Committee:

Censors.

Raymond H. P. Crawfurd, M.D., Horace George Turney, O.B.E., M.D., Herbert Morley Fletcher, M.D., Bertrand Edward Baron Dawson of Penn, G.C.V.O., K.C.M.G., C.B., M.D.

Examiners.

Chemistry.—William Bradshaw Tuck, D.Sc., Charles Stanley Gibson, O.B.E., B.Sc., F.C.S.

Physics.—Frederick Womack, M.B., B.Sc., Alfred Henry Fison, D.Sc.

Practical Pharmacy.—Alfred Ernest Russell, M.D., Edward Alfred Cockayne, M.D., Philip Hamill, M.D., Alfred Joseph Clark, M.C., M.D., Water Ernest Dixon, O.B.E., M.D.

Physiology.—John Beresford Leathes, M.B., John Mellanby, M.D.

Anatomy.—Thomas Baillie Johnston, M.B.

Medical Anatomy and Principles and Practice of Medicine.—William Aldren Turner, C.B., M.D., Herbert Morley Fletcher, M.D., John Walter Carr, C.B.E., M.D., Joseph John Perkins, M.B., Arthur Philip Beddard, M.D., Arthur John Hall, M.D., Sir James Purves Stewart, K.C.M.G., C.B., M.D., Robert A. Young, C.B.E., M.D., Charles Bolton, C.B.E., M.D., Sir William Henry Willcox, C.B., C.M.G., M.D.

Midwifery and Diseases Peculiar to Women.—John Prescott Hedley, M.B., Ewen John Maclean, M.D., Thomas George Stevens, M.D., John Davis Barris, M.B., Harold Chapple, M.B., F.R.C.S.

Public Health.—Part I: Henry Wilson Hake, Ph.D.; Part II: David Samuel Davies, M.D.

Tropical Medicine.—John C. Grant Ledingham, M.B. (Bacteriology), John Brian Christopherson, C.B.E., M.D. (Diseases and Hygiene of the Tropics).

Ophthalmic Medicine and Surgery.—Gordon Morgan Holmes, C.M.G. C.B.E., M.D.

Psychological Medicine.—Part I: Henry Devine, O.B.E., M.D. Part II: James Taylor, C.B.E., M.D., Charles Hubert Bond, C.B.E., M.D.

Dr. Lauriston Shaw was appointed a councillor in the place of the late Dr. W. H. R. Rivers. At the request of the Royal Society of British Architects Dr. Dawtrey Drewitt was appointed representative of the college on a committee to consider the commemoration of the bicentenary of the death of Sir Christopher Wren. Sir Arthur Keith was given permission to photograph the portrait of Sir Thomas Browne in the possession of the college. At the request of Mr. Holman Wilson the college agreed to help in re-erecting in the church of St. Leonard's, Exeter, certain panels which formed part of the altar tomb of Dr. William Musgrave, F.R.C.P., F.R.S. Mr. T. J. C. Tomlin, K.C., was appointed senior standing counsel to the college. A report from the Censors Board concerning the Lloyd Robert Lectureship was referred to the college lawyers. The membership which Dr. R. A. Chisolm resigned in 1919 was restored to him. Sir William Church and Sir Thomas Barlow were reappointed members of the Executive Committee of the Imperial Cancer Research Fund, on the nomination of that committee, and Sir Frederick Andrewes was reappointed a representative on the same committee.

A report was received from the representatives of the two Royal Colleges on the International Congress of Ophthalmology, held at Washington in April last. (Mr. E. Treacher Collins, F.R.C.S.) An invitation to hold the next congress in London in 1925 was accepted. After some formal business the comitia was dissolved.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary council was held on July 27th, when Sir Anthony Bowlby, President, was in the chair.

Diplomas.

Diplomas of membership were granted to 113 candidates found qualified at the recent examinations. The Diploma in Tropical Medicine and Hygiene was granted to 17 candidates (jointly with the Royal College of Physicians) recently found qualified. The Diploma in Ophthalmic Medicine and Surgery was granted to 14 candidates found qualified (in conjunction with the Royal College of Physicians).

Examiners.

Mr. F. F. Burghard was re-elected a member of the Court of Examiners, and Dr. I. Lewin Payne was elected a member of the Board of Examiners in Dental Surgery.

Imperial Cancer Research Fund.

Sir William Church and Sir Thomas Barlow were re-elected members of the Executive Committee of the Imperial Cancer Research Fund.

CONJOINT BOARD IN ENGLAND.

Forensic Medicine.

THE synopsis of forensic medicine has been revised by the Committee of Management of the Conjoint Board in England, and has now been adopted both by the Royal College of Physicians of London and the Royal College of Surgeons of England. It is as follows:

Privileges and obligations of medical practitioners. Medical registration. Medical certificates and notifications. Medical evidence. Dying declarations. Procedure relating to coroners' inquests.

Signs of death and the phenomena which follow death. Putrefaction in air. Putrefaction in water. Mummification. Formation of adipocere. Inspection of the dead body and *post-mortem* examination.

Medico-legal aspects of identification.

Modes of dying. Causes of sudden death.

Death from the following causes: Wounds and mechanical injuries. Hanging. Strangulation. Suffocation. Drowning. Electrical current and lightning. Starvation.

Indications of death from accident, suicide, or homicide. Methods of recognition of blood stains.

Poisoning.—Medico-legal duties of medical practitioners in cases of poisoning. Symptoms and *post-mortem* appearances produced by the common inorganic, organic, and gaseous poisons, and the treatment of the patient.

Method of *post-mortem* examination in cases of poisoning, and reservation of parts of the body for analysis.

Simple tests for common poisons. The sale of poisons.

Medico-legal questions relating to pregnancy, delivery, rape, criminal abortion, infanticide.

The lunacy laws in so far as they affect the medical practitioner in relation to the signing of certificates of lunacy.

Obituary.

THE LATE SIR EDWARD MALINS.

DR. THOMAS WILSON (Birmingham) has been good enough to send the following appreciation of his late colleague and friend:

Thirty years ago when I became his junior colleague at the old General Hospital Malins had already been in practice in Birmingham for twenty years, and his name was a household word in the city and a large surrounding district. I was at once impressed by the constant and punctual discharge of his hospital duties, and by his devotion to, and sympathetic interest in, his patients, as well as by his knowledge and skill. His patients looked up to him with esteem and respect, and returned his care with real affection. In the students he took a close and kindly interest, and to his colleagues, and especially the juniors, he was ever considerate and loyal. When illness or misfortune overtook those who had worked with him his ready sympathy, and when needed his generous help, were unobtrusively given. He became a specialist after a long and arduous general training, first by apprenticeship, then by the usual course in the University of Edinburgh, and afterwards by some years in busy general practice. Before leaving Edinburgh he had become assistant to Sir James Simpson, and so had acquired a sound practical acquaintance with the principles of midwifery and diseases of women. Through the whole of his life his mind remained open to new ideas, and he earnestly and successfully strove to keep abreast of advances in knowledge and practice as the specialty developed from the era of mechanical pathology and pessaries to that of surgical and more modern scientific methods.

As Professor in the University Sir Edward Malins took the greatest pains to keep his teaching on the highest and most advanced level, was most assiduous and punctual in the discharge of his duties, and possessed the esteem and regard of the students to a marked degree. As an examiner of students and nurses he was judicial and impartial, patient and considerate. He devoted a large part of his life to the service of the General Hospital and of the University, taking a profound interest in both and giving to them of his best. Outside his professional work he had many interests. A devoted and hard-working churchman, he practised his religion unobtrusively in his daily life. In political and social matters he took an active interest, and of general literature he was a diligent and widely read student. At the University Graduates' Club, of which he was twice President, he was a regular attendant, and was esteemed one of the most valued and interesting speakers. In daily intercourse he bore himself with quiet and unassuming courtesy. To him came many honours, unsought, modestly accepted, and sustained with dignity. Among them, the most welcome to his local brethren and I think to himself, was the highest in the power of the members of his specialty to bestow—the Presidency of the London Obstetrical Society, to which office he was the first provincial member to be elected. His presence and example will be missed in many circles, and in none more than in that of the brethren of his specialty. By them he was honoured and esteemed, and among them his place will not readily be filled.

SIR FRANCIS CHAMPNEYS writes:

The obituary notice of Sir Edward Malins, accurate as it doubtless is on matters of history, lacks the personal note which should give life to a biography. The fact that he had attained the advanced age of 80 is probably accountable for this. But there are some who remember their association with him in active work. Sir Edward was a very old member of the Obstetrical Society, and it must be forty years since I was first associated with him at that society, which has now become the Obstetrical and Gynaecological Section of the Royal Society of Medicine. He was, I think, the first provincial Fellow to become its president, and he discharged his duties remarkably well. His characteristics, indeed, were dignity, courtesy, firmness, sound judgement, uprightness, and public spirit. It was always a pleasure to work with him. He leaves the memory of a long and very useful life behind him, and he rests from his labours.

THE death is announced of Dr. GAVIN STIELL of Clapham, who was one of the best known medical practitioners in south London. Dr. Stiell was born in 1857, and was educated at Dunfermline High School and Edinburgh University; he graduated M.B., C.M. in 1881, and M.D. in 1897. After holding various appointments he settled in Clapham in 1887 and built up there a very large general practice. He kept himself well abreast of recent developments in medicine and surgery, and his sympathetic and kindly nature, with his unceasing care and devotion to his work, gained him the affection and esteem of all with whom he came in contact. He was an old member of the British Medical Association and one of the original Fellows of the British Balneological and Climatological Society, of which he remained a member until its amalgamation with the Royal Society of Medicine, of which he was also a Fellow. He is survived by his widow and two sons, both of whom have adopted the medical profession, the elder practising in Clapham in association with his father, and the other in Lincoln.

Medical News.

FOR the Ladies' Golf Competition in connexion with the Annual Meeting of the British Medical Association at Glasgow there were sixteen entries, but owing to the inclemency of the weather only eleven actually played. Miss Robertson, Elioch Lodge, Prestwick, won the prize for the best round; Mrs. Lamb, Mount Annan Drive, Mount Florida, won the prize for the hidden holes. The prizes were the gift of Mr. William Rankin.

MAJOR-GENERAL C. E. POLLOCK, C.B., C.B.E., D.S.O., late R.A.M.C., has been appointed Deputy Director-General, Army Medical Services, vice Major-General Sir George B. Stanistreet, K.B.E., C.B., C.M.G., late R.A.M.C.

THE National Health Society, in compliance with the alteration made in the Regulations of the Board of Education for the training of health visitors, is arranging a shortened course of training for qualified nurses and health visitors of three years' service under local authorities. The next course commences in September. Particulars may be obtained from the secretary, 53, Berners Street, W.1.

A CONFERENCE on the disposal of London refuse was held at the Ministry of Health at the end of June, and the Minister has now issued a memorandum covering a poster detailing the precautions which should be taken, not only in London but elsewhere, in managing refuse tips to prevent the causation of nuisance. The principal precautions recommended are that the refuse should be deposited in shallow layers, and that each layer should be promptly covered with earth or other suitable material to prevent nuisance from fire, rats, flies, or smells.

AT the suggestion of the Medical Director the Health Committee of the League of Nations Union has invited certain Governments to nominate commissions of some four or five public health medical officers to spend three months working in the health administrations of other countries.

AT the June matriculation examination of the University of London there were 169 successful candidates in the first division and 1,258 in the second division, while 36 secured the supplementary certificate for Latin.

THE summer general meeting of the Irish Medical Schools' and Graduates' Association was held in the Grand Hotel, Glasgow, on July 24th, the President, Dr. J. A. Macdonald, LL.D., in the chair. Forty-eight members and their friends had previously had lunch together, when the President said he had much pleasure in announcing that the number of new members enrolled during the previous twelvemonth was the largest recorded in any similar period in the history of the association, extending over forty-four years. He quite anticipated that the total number on the roll by the time his year of office had expired (next St. Patrick's Day) would be fully a thousand. When this total was reached they would be in a position to resume the "monopoly" fight, which in days gone by had been so successful. It would not be long, he (the chairman) felt sure, before the English lovers of justice would cause the barriers to be removed which now prevented the Fellows of Irish and Scottish Colleges from even becoming candidates for positions on the honorary staffs of general

hospitals in England. The toast of the King's health having been very heartily received, that of the Guests was proposed by Dr. James Stewart and responded to by Dr. Agnes Estcourt-Oswald, whereupon the meeting adjourned.

THE Board of Education has issued a pamphlet (price 3d. net) giving a list of institutions recognized by the Board under regulations for nursery schools, the training of health visitors, and the training of midwives; and a revised list of institutions for the welfare of the blind and of defective and epileptic children.

A CHRISTIAN Science practitioner was found guilty recently, in the municipal court of Cleveland, Ohio, of practising medicine without a licence, and was fined 100 dols. and costs.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

INCOME TAX.

"MEDICO" recently purchased a practice, and claimed £45 for expense of drugs purchased on taking over. This has been disallowed as capital outlay.

*** The amount allowable is the cost of the drugs consumed in the year's work, and the cost of the total stock taken over is part of the cost of the practice as a whole and inadmissible for tax purposes.

"G. K." inquires whether he is correct in assuming that "flat-rate remuneration, National Health Insurance fees, and Parish Council salary are still assessable under Schedule D."

*** The last mentioned is technically assessable Schedule E, but the other two appear not to be profits of "employment" and consequently assessable Schedule D. If these two considerably outweigh the other source of income we conceive that the authorities would continue the practice of pooling the whole in one Schedule D assessment.

"F. A. A." sold a 1916 Overland Coupé 20-25 h.p. and bought a 1922 Rover 12 h.p. The latter car cost £200 more than the old car did, the net cost of the renewal being £425. The inspector of taxes refuses to allow more than £325 on the ground that £100 or more was expended on improvement.

*** The amount allowable is the 1922 cost of a 20-25-h.p. Coupé Overland less £225 received for the old car. On this basis the inspector's action seems justified.

WARTS OF THE SCALP.

"X. Y. Z." would be glad to hear of a satisfactory treatment of warts of the scalp. Snipping and the cautery have been tried without benefit, but treatment is hampered by the risk of losing the hair.

*** Warts of the scalp usually yield readily to an application of radium.

RELIEF OF PAIN IN ACROMEGALY.

DR. J. H. DOUGLAS WEBSTER (London) writes in reply to Dr. W. Gover (Hastings), who inquired how the intolerable pain in acromegaly could be relieved: *X*-ray treatment often gives speedy relief to the symptoms—headache, contraction of visual fields, etc. I have published a case, and others have recorded similar good effects from *x*-ray treatment. At the Scandinavian Radiological Congress in Copenhagen last year many good results were reported, in cases of intracranial tumours, from radiotherapy.

LETTERS, NOTES, ETC.

A "SERIOUS CASE."

DR. W. JOHNSON SMYTH (Bournemouth) writes: Acutely apprehensive of only a brief span of life a lady consulted me lately and explained that a specialist recently discovered that she suffered from an "impalpable spleen" and that he took a very serious view of her ailment. I corroborated the specialist's discovery, prescribed a rich diet and a few noisy electrical remedies with which she was not familiar. Her recovery was rapid.

HOSPITAL *v.* ASYLUM.

DR. S. E. WHITE (London, E.) writes: The hospitalization of asylums is in the air. No lovelier thing could be devised than to remove the shadow that broods over asylum life; to give light to them that sit in darkness, and to introduce into that dim forsaken land methods by which the heart is cheered and health restored. Professor G. M. Robertson proclaims: "Let there be no more prison atmosphere! We do not call in a magistrate to sanction admission into a hospital." True, but the patient can in this case discharge himself. Does the professor intend that no greater measure of detention shall in the future be exercised over the unbalanced than prevails in hospitals for bodily disease? He can hardly mean that. He has a plan whereby those who enter voluntarily can be detained for six months on medical authority alone—the arrangements being strongly commended by the fact that there will be "no certification"—that means, no provision for any judicial intervention or appeal. This proposal is naturally accepted readily by those who keep asylums. But no roseate picture of the delights of hospitalized asylums can reconcile most people to the loss of liberty. The sense of the rights of the subject has entrenched itself so firmly behind English law that psychiatrists find it no easy matter to drive it out. Five times since 1905 the Lunacy Commission has essayed to pass this measure through Parliament, but without avail. The sense of fair play has been too strong. Fain would the Board of Control gather under its wing all early cases to detain them for their good; but the early cases refuse to flock to it. The Board is not at all satisfied with its function of looking after the certified—that is, the helpless whom they are supposed to protect—but would willingly find "half-way houses" for all those who are on the way to being certified. There exist at the present moment all over our land huge institutions into which are gathered a heterogeneous mass of people. Some of these indubitably require restraint, but an equally large number are housed therein who would recover much more speedily if invited to appropriately equipped cheerful sanatoriums and spared this iron rule. There ought to be called into being some suitable *alternatives* to asylums. It is a crying need. But the new hostels must be hospitals in fact, not semi asylums. Once liberty is interfered with, it is all-essential that, to prevent injustice, something in the nature of an inquiry must be held; the "alleged lunatic" ought to be told what is being alleged, and be permitted to defend himself. This is only fair. As things are at present, everything is done in secret; and according to the proposals now issuing from the Health Ministry the proceedings are likely to become still more subterranean. This is a retrograde step. No measure of the kind is needed. *No legislative barrier stands in the way of running hospitals without detention.* Before committing a man to an asylum, he ought to be proved to be dangerous and unfit to be at large. For all others, the true hope of the future lies in the starting of real hospitals with reassuring atmosphere and free access to the air and light of heaven.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 27, 30, 31, and 32 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 28 and 29.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 84.

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An average line contains six words.

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Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.

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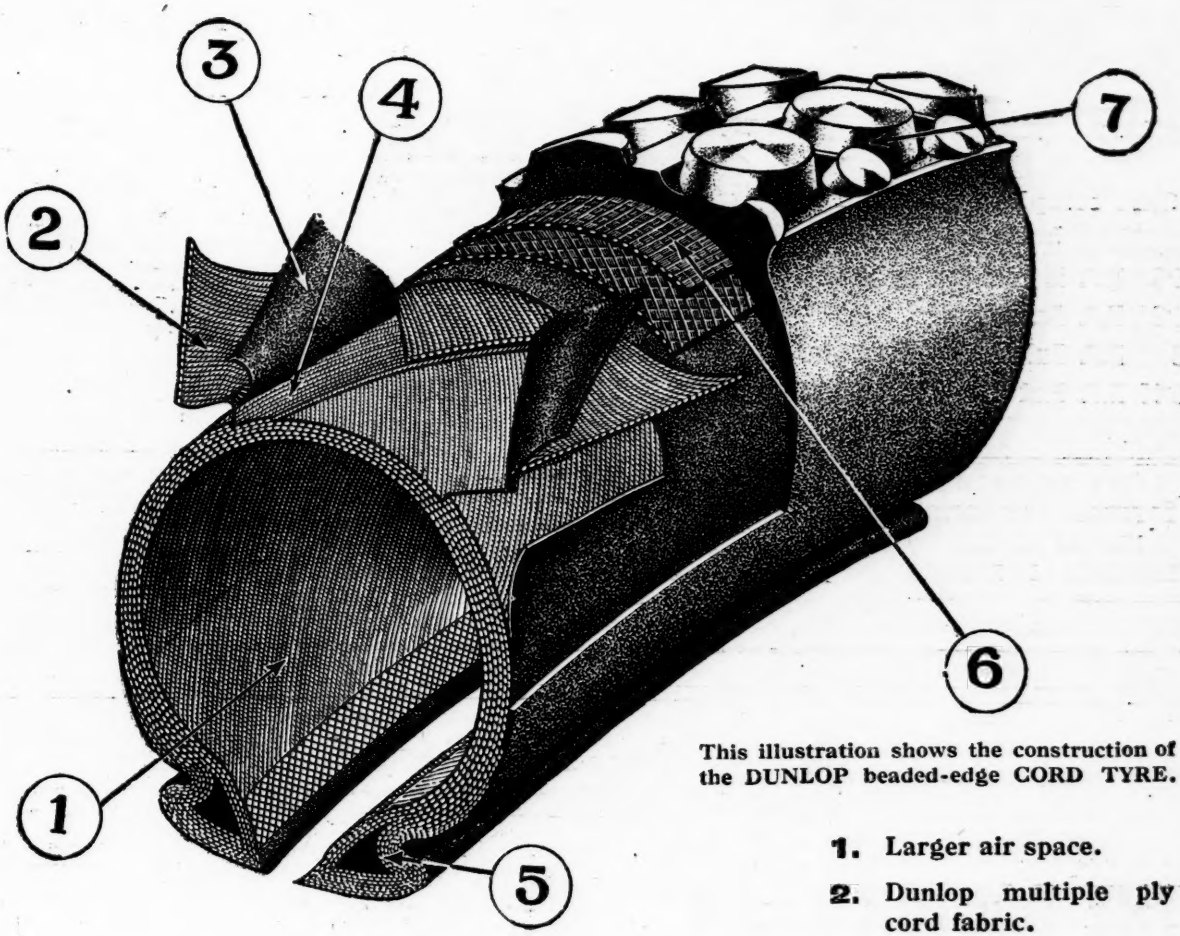

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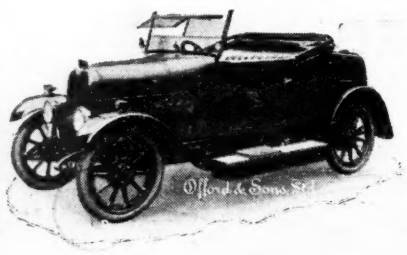

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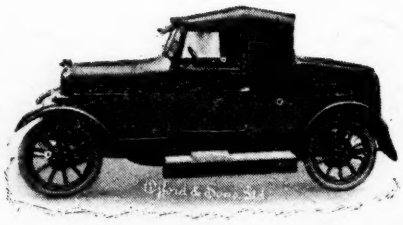

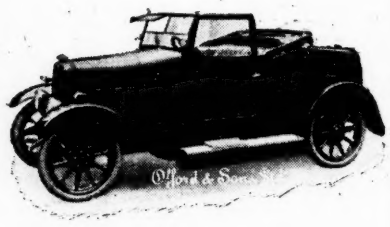

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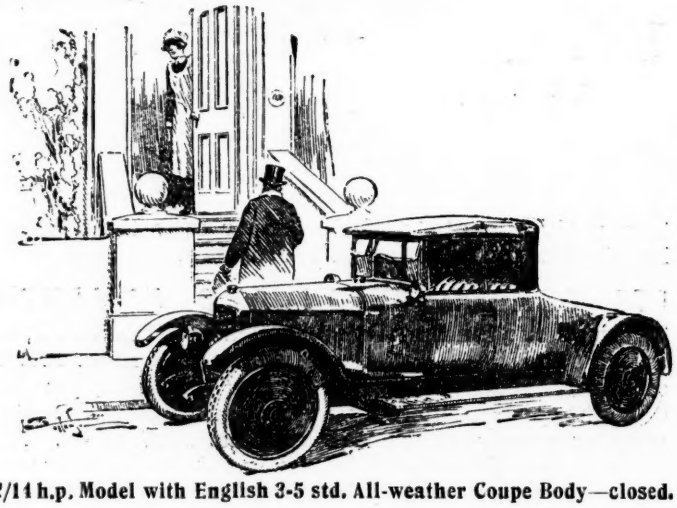

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J. GRAHAM KERR, M.A., F.R.S.,
REGIUS PROFESSOR OF ZOOLOGY IN THE UNIVERSITY OF GLASGOW.

SOME years ago at a dinner in this city I was called upon to propose the health of a distinguished company of physicians, and in doing so I recalled an incident that happened long ago during one of my early expeditions in South America. I had arrived in the country of a tribe of primitive red men and was engaged in the preliminary work of getting our relations on a satisfactory basis. One day I found myself traversing one of the great swamps of the region alone with one of the most potent members of the tribe. We arrived at a particular spot, and he indicated that he would fish: he bent the swamp vegetation out of the way so as to make a little clear pool a foot or two in diameter; then he baited his hook and patiently waited for the fish to nose their way into the pool through the surrounding vegetation. There we remained for an hour or two in silence, he from time to time pulling out a fish, while each of us regarded critically the other, sizing one another up, as the slang expression has it. And as we communed together—that naked red-skinned savage and I, a callow graduate of Cambridge—there gradually crept across my mind the thought that there beside me was a fossil man—a living fossil—the medicine man of the tribe, the evolutionary ancestor of our two professions, that of the naturalist and that of the physician, and of the priest by the way as well.

That after-dinner speech had—as perhaps most of my after-dinner speeches have not—a good effect, for one of the subsequent speakers made known to me that charming and scholarly address entitled, "The Physician as Naturalist," delivered by Sir William Gairdner when President of the British Medical Association in 1888. Indirectly, too, it was the cause, when I had the honour of being invited to deliver to-night's lecture, of my choice of title.

What I propose to do, then, is to glance at the physician in his rôle as a citizen of our community and to say something about three different aspects of him and his work—that of the naturalist, that of the teacher, and that of the benefactor.

THE PHYSICIAN AS NATURALIST.

The professional biologist or naturalist (I use the two words as synonyms) has necessarily a strong fellow-feeling with those who follow the profession of medicine, for in these days it is generally recognized—with every year it becomes more definitely recognized—that medicine is a branch of applied biology. The profession of medicine is the one great learned profession in which it is officially recognized that a training in the elements of biology, and an elementary knowledge of the methods and principles of that science, must lie at the foundation of professional training if that foundation is to be well and truly laid. And it is extraordinarily fascinating to watch the evolution of medical science, and see how more and more its problems become recognized as problems of natural history.

Take the general mechanism of the body. We see it in its simplest form away down in the protozoa of freshwater pools—single cells leading a solitary existence, or it may be attached to one another in little groups that blunder about in their watery environment. As evolution proceeds, bigger and bigger groups of these cells remain attached together, but as the cell community increases in size its movements become more precise, its activities more definite: it develops more and more strongly an individuality of its own. It evolves at length into one of these marvellous cell communities exemplified by the body of one of the more complex animals, such as a butterfly, a bird, or a man.

How does such an individual compare with the simple protozoan individual? In the first place, it is composed of an enormously greater number of cell individuals. In the second place, these cell individuals are no longer all alike; they have become specialized for different functions—some to form a rigid supporting skeleton, some to form muscles to move the parts of the skeleton on one another and so to bring about movements of the body as a whole, some to absorb food or oxygen, or to get rid of poisonous waste materials. In the third place, the enormously increased size of the cell community renders it necessary to have a special co-ordinating mechanism to knit the whole together into a coherent individuality—the nervous system. And, lastly, there is a point which is very usually overlooked—the primitive protozoon was aquatic; its surface was bathed directly by the water in which it lived. I said water, but of course it is not water in the precise chemical sense of the word. Water—pure water—is a substance which no one has ever seen. If it could be produced it would not remain for an instant of time: other substances instantly dissolve in it. If it falls as a drop of rain the gases of the atmosphere pass into it; if it trickles on the ground it dissolves other material as it goes. What we call water, then, in ordinary life is really a dilute watery solution of many different substances.

Now, as the animal body has proceeded along its evolutionary path, the majority of the cells composing it have become shut away from the external medium; it may be, as in the case of the butterfly or the man, that that external medium is no longer water but air. But yet we find that the cells of the body are still leading their ancient aquatic existence, for the body has enclosed within it a certain amount of water—what was called the internal medium by the great French physiologist Claude Bernard—and this bathes the surface of every constituent cell. The ancestral watery pool was affected in composition by its living inhabitants, the more so the more crowded they were; they absorbed from the water oxygen and food material, while, on the other hand, they discharged into it the various waste products of their bodies, both food material and waste products being liable to differ according to the particular type of creature. And so also with the internal medium of the body. It bathes the surface of the myriad members of the cell community. Each takes from it the food that it needs for its special activities; each discharges into it the particular waste substances which happen to be the product of its own peculiar activities.

It follows, then, that the internal medium of the body is a fluid of extreme, although ordered, complexity, and the cell individuals are adapted to live in a medium of this particular complexity, just as one animal is adapted to live in fresh water and another in salt. The composition does not remain absolutely without change—nothing does in the living body—it is liable to alteration from time to time, as one or other type of its cell inhabitants is more or less active in what it discharges into it or takes away from it. And these little fluctuations in the composition of the internal medium are actually made use of in the normal activities of the body: they set agoing the appropriate reactions of the body necessary to meet the ordinary contingencies of life—for example, if the proportion of carbon dioxide becomes increased by ever so little it at once serves as a danger signal to the respiratory centre in the brain, and this instantly causes the breathing movements to be accelerated; or again, a little change in composition which normally follows the taking in of food at once brings about formation of the necessary digestive juices. While the reactions to these commonly occurring little changes in the composition of the internal medium form part of the ordinary life of the individual it is otherwise when changes of greater amplitude occur. Then uncomfortable, and it may be disastrous, effects are produced on the cell inhabitants, and the condition becomes pathological in place of physiological; it may be that all members of the cell community alike are affected, but more usually the ill effect will vary in different parts or different tissues of the body, according as the particular set of cell individuals is more or less exposed to the influence of the internal medium, or, on the other hand, more or less sensitive to the particular change that has taken place.

The modern physician, however, has come to be interested not merely in the natural history of the body of man in itself. He has been given cause to interest himself in the biological relations of man with the other living organisms of the world around him, for these relations affect in the most intimate way the health of mankind. How better could I illustrate this than by the familiar case of malaria? Reckoned in its direct and indirect effects the most destructive of all diseases, it has been estimated to cause one-half of the entire mortality of the human race. It is only a comparatively few years ago that the method to be adopted to combat malaria formed one of the most insistent problems confronting medical science.

I had the curiosity to look up the article "Malaria" in the ninth edition of the *Encyclopaedia Britannica* to refresh my

memory as to how this problem was regarded in the days immediately preceding the time when it found its solution as a problem of natural history, and this is what I read:

"The most prevalent hypothesis of malaria is that it is a specific poison generated in the soil. Perhaps not every soil is capable, under circumstances, of causing malaria, but it is difficult to assign limits to its potential presence. There are seemingly well-authenticated cases of malarial disease appearing during the making of railway cuttings, canals, and other excavations, in places where malaria had not previously been known; and there is sufficient evidence that malaria has appeared in the track of cultivation in the Western States of America, and that it follows the upturning of virgin soil, and even of soil that has been long fallow. Attempts have been made, without success, to separate a malarious poison from the gas generated by swamps, or from the air of malarious localities. Still more attempts have been made to discover the hypothetical poison among the numerous minute vegetable organisms that occur in the soil. . . . Another hypothesis is that malaria is a 'telluric intoxication,' generated by the vegetative power of the soil when that power is not duly exhausted by plant growth. Lastly, there is an hypothesis that malarial fevers are caused by the excessive and sudden abstraction of heat from the body under the influence of cold and damp. . . ."

Does it not seem *incredible* that these words fairly represent the views regarding the malaria problem that were current as late as the "eighties" and "nineties"—blind gropings without a suspicion as to the true solution?

How different to day: the problem solved in almost every detail—so that there is no disease which medical science can combat more effectively than malaria. And how has all this come about? Because the malaria problem came to be tackled as a problem in natural history. As you all know, it turns out that malaria is a possession not of man alone, but of a dual partnership—man and a particular type of mosquito. Man catches the disease from the mosquito: the mosquito catches it from man. If man were exterminated in a particular locality it would conduce to the health of the local mosquitos: they could no longer catch malaria. If, on the other hand, the anopheline mosquitos were exterminated from a particular locality, then the human inhabitants could no longer catch malaria. In the solution of the details of the problem many workers were concerned, but the all-important part—the demonstration of the relationship between the malaria type of microbe and the mosquito—was the work of our own countryman Ronald Ross, and it was that demonstration that pointed the way to the anti-mosquito campaigns by which Ross and his followers have been able to diminish, or even to clear out entirely, malarial disease in many of the most deadly spots in the warmer regions of the world.

I have mentioned malaria because it affords an extraordinarily striking case of a medical problem finding its solution along the lines of natural history. There are many other cases similar in nature, though less impressive in the scale of size. To us in Scotland naturally occur in this connexion the names of David Bruce and William Leishman, and of their younger followers such as Leiper and Muriel Robertson.

Instead of taking the case of a specific disease like malaria I might very well have taken some of the more general processes of the body in which medicine interests itself, such as, for example, the general protective mechanism of the body against microbes. As we have seen, the body consists of a cell community or cell republic. Its constituent cells are protected from the assaults of alien and hostile cells by their enclosure within an elaborate defensive envelope, the skin. Certain types of microbe, however, possess the power of making their way through the skin, while in any case the skin is liable to be breached by accident, the way being thus opened to hostile invasion.

It follows, then, that the cell republic of the body requires internal defensive arrangements to deal with invaders that have passed the outer defences, and the investigation of these defensive arrangements admittedly constitutes one of the most important chapters in modern medicine, associated as it has been with immensely important practical developments in the science of healing. But they also constitute one of the most fascinating chapters in modern biology, and perhaps the name to which posterity will accord the highest position in the history of these developments is that of a professional zoologist, Metchnikoff. In his early days Metchnikoff had worked at the embryology of a great variety of the lower types of animal and published a large mass of important embryological work.

In various of these simply organized creatures, on which Metchnikoff worked, he came across a phenomenon which we still call by his name, phagocytosis, and the recognition of this constituted one of the chief steps in his work on the defensive mechanism. This phagocytosis is really a primitive kind of feeding on the part of the individual cell. If you watch the simplest and most primitive of the protozoa—the creature called Amoeba, which is to be found creeping about in freshwater pools—you can sometimes see it feed. The soft protoplasm of its body simply flows round and engulfs the smaller creature which it devours. It may be that it is subsisting on these tiny plant cells which we call bacteria. These individually are too minute and too little resistant to be engulfed singly in the ordinary way, but a peculiar waste substance given out by the amoeba's body possesses the remarkable property of causing the bacteria to adhere together into a sticky mass which the amoeba is then able to devour in the ordinary way. The bacteria so taken in are destroyed (digested) within the protoplasm of the amoeba: a case of what is called intracellular digestion—digestion taking place within the protoplasm of an individual cell. Metchnikoff's great discovery was that certain of the cells in animals higher in the scale than protozoa retain this ancient power of intracellular digestion. These are the cells to which he gave the name phagocytes; and these phagocytes he found constituted an effective defence force in the animal body. He introduced little foreign particles into the body of a young starfish and saw how they were devoured and disposed of by the phagocytes; he studied a fungus disease which affected water fleas, and was able to see, as he watched the transparent body of the water-flea through his microscope, how the spores of the fungus which had found an entrance to the body were fallen upon and usually destroyed by the defence force of phagocytes. It would be fascinating to trace out how Metchnikoff proceeded from his basic studies on these lowly organized creatures into the domain of human pathology, but it will perhaps suffice if I say that this great figure in the history of modern medicine, whose foundation work was pure zoology, continued to the end of his days to be a naturalist in his methods and in his outlook.

But it is not merely these great outstanding figures in medicine, when they are tackling its outstanding problems, that show themselves to be naturalists. In the familiar problems of his everyday life the physician finds himself confronted at every turn with problems of natural history, and in grappling with them he uses at every step those methods of observation that are those of the naturalist. He remains, in fact, throughout his working life a naturalist.

THE PHYSICIAN AS TEACHER.

The physician of to-day is, then, like his far back forbear amongst primitive man, a naturalist. The point that I would next make is that in a human community like ours this fact confers upon the physician peculiar power and peculiar responsibility as a teacher. The physicians of to-day constitute the one big section of our citizens who, through their training and their daily work, have acquired a grasp of biological principles. To them, as to no others, falls the task of spreading these principles among their fellow citizens.

Human communities are organisms. Here and there, in remote and secluded corners, you may find them lingering on in early stages of their evolutionary progress—each little nomad company composed of only a few unspecialized individuals who readily dissolve partnership under the stress of circumstance. While still lingering on here and there in remote spots, where they are free from the pressure of competition, these little primitive communities are on the verge of disappearance. As time goes on they vanish away, often without leaving a trace behind, yielding their place to other communities that have reached a higher grade of evolution.

What, now, are the distinguishing characteristics of these more successful communities? They are precisely the same as those that characterize the more successful, or as we human beings usually call them the higher, types of animal organism. The community is composed of an enormously greater number of individuals, and these are not all alike but have undergone specialization for different functions in the community, and finally the individuals are knit together by a highly evolved social organization, so that the community is able itself to act as an immensely powerful individual of a higher order.

This organization that knits the individuals of the community together and that plays such an important part in rendering the community efficient is naturally exceedingly

complex and involves many potent though often elusive factors which work beneath the surface of our civilized society: factors which make for the smooth running and efficiency of the social mechanism; factors which have to be appreciated and fostered by the teacher of good citizenship; factors such as self-abnegation—the subordination of the interests of self to those of the community, patriotism, loyalty to comrades, Christianity.

Now the physician, naturalist, in daily touch with living processes, spending his life in the study and treatment of live human beings, knowing so well their frailty and their strength, an optimist, realizing how infinitely commoner is warm-heartedness than cold-bloodedness: *who* is there that can teach these principles of citizenship with such understanding and sympathy as he? And who, again, is in the position of making his teaching so effective as the physician? Coming into each house on his errand of mercy he necessarily establishes relations of such humanness and such intimacy as to give his words unparalleled power. In these days of unrest, when the air is filled with the discordant street cries of every kind of fadmonger, do we not greatly need the physician as teacher?

No one who interests himself practically in social problems can fail to realize to what an extent social trouble and friction are due simply to ignorance. The uneducated mind that is blank and yet receptive stands ready to absorb unquestioningly whatever is put before it. But, most unfortunately, the only members of the community that as a rule put anything before it are the extremists. Sometimes these extremists are inspired simply by evil and greed, but far more often—and these are the more dangerous—they are inspired by perfectly honest but lop-sided idealism. They use the simple arts of the demagogue; above all, the classification of their fellow men into sharply demarcated categories. Most usually these are only two in number. They may call them the saved and the damned, or they may use some other pair of adjectives nearly as sweeping; but whatever the pair of adjectives are, they connote respectively agreement and disagreement with the speaker. Those included in the one category are wholly good, those in the other category are wholly evil, and anything in the way of fair and calm judgement is rendered completely impossible.

The physician is eminently qualified to diffuse an atmosphere of sane common sense into the troubled discussion of social problems; his whole work conduces to sanity and common sense. He is accustomed to judge humanity unclothed. He is accustomed to strip off the clothing of humbug and pretence. His interests are with the real man himself, and he has learned that, apart from sex, Nature does *not* group human beings into absolute categories. He sees his fellow men all fundamentally alike with infinitely varying little differences in detail; he sees through all the same dominating strain of goodness, the same disturbing little elements of evil. Realizing always that men are human he appreciates what a factor in social trouble is the regarding them as so many soulless machines. His constant intercourse with men when they are in trouble makes him kindly and tolerant; at every step he is in touch with phenomena that he cannot comprehend—how much there is even in the simplest living body that no man understands!—and this makes for humility of spirit.

The physician has, then, in a community like ours, vast powers as a teacher of these principles that mean so much to communal society. He can do much by spreading these principles and also by spreading knowledge of what is really meant by science and the scientific method. He has these powers, and I for one believe that he is constantly, even if unconsciously, exercising them. He may not do ten minutes' formal teaching during his whole life, and yet as he goes about his daily work he is insensibly diffusing around him an appreciation of these principles and these interests. The great majority of our fellow citizens are steeped in the most profound ignorance of what these terms mean, and the result is incalculable loss to the community in all kinds of ways.

THE PHYSICIAN AS BENEFACTOR.

In ordinary life we are familiar with the benefits we owe to our medical man. He comes in and helps us in emergency. We pay him his fee, and to many a man that ends the matter. He does not feel constrained to be grateful; he feels he has bought the assistance that has been given him; he has paid for the advice and help of his doctor as he might pay for some material commodity or as he might pay for expert help in any skilled operation, such as a bit of engineering work. But what he is apt to ignore is that in the big things of medicine the monetary payment bears no relation whatever to the value received. If I am at death's door and am saved by an operation the fee that I pay is simply an honorarium graduated according to my means; it in no sense expresses the value of the life that has been given back to me. If I had to assess that value I should probably mention some figure of a totally different order; I might be willing to pledge all my future earnings in return for continued life.

I think we laymen are apt, as individuals, to forget this aspect of medicine—but how much more do we as a community consistently forget it! Just think of the value to the community of the work of a great pioneer in medicine. I will mention two because they happen to appeal to me particularly.

Lister.

Twenty-five years or so ago I had to read a paper of mine to a scientific society. The society was the Royal Society, and in the presidential chair there sat a man who, to my young, impressionable eye conveyed the impression not so much of overpowering greatness as rather of infinite kindness and goodness. There was no oppressive sense of vast knowledge; there was rather the humility of the man conscious of his contact with the infinite unknown. That man had been once a professor in the University of Glasgow. Thirty years before he had been responsible for what is probably the greatest event of world history that has ever happened in Glasgow. He worked in the Royal Infirmary, and there—his big mind able to grasp the practical possibilities that rested on the work of Pasteur—he laid the foundations and erected the main framework of the magnificent edifice of modern aseptic surgery. Most of us here, I dare say, know that grimy old building in which Lister worked—that priceless possession of the Glasgow Medical School, that sacred shrine to which in future ages pilgrims will come from the ends of the civilized earth.

What mankind owes to aseptic surgery can be realized vividly by anyone who cares to read of the horrors of hospital wards in pre-Listerian days. In the hospitals of London, Edinburgh, and Glasgow the death rate of amputation cases averaged about 40 per cent. During the Franco-Prussian war of 1870–71 there were slightly over 13,000 amputations recorded by the French military authorities; of these cases just over 10,000 died. One of the most skilful Prussian surgeons records an unbroken series of thirty-six amputations at the knee-joint, each one resulting in death. In the Munich State Hospital it is recorded that in the year 1874 80 per cent. of all the surgical cases were either killed or badly crippled by hospital gangrene.

However, it is hardly necessary to refer to these old records, for I suppose we may take it that to-day every educated man or woman realizes in a general way what the development of aseptic surgery has meant; most people probably realize that the total destruction of human life in the great war becomes almost insignificant when compared with the total saving of human life which we owe to aseptic surgery. I will therefore not dwell longer on Lister's work: I will pass on and give an example of benefit rendered to mankind from the other side of medical science. I cannot do better than take as my example the case of the mosquito-borne diseases, the successful combating of which we owe above all to Ross.

Ross.

Earlier in the lecture I referred to malaria as being declared by competent authorities to be the most destructive to human life of all known diseases. The malaria death rate in the United States was estimated as late as the year 1908 at about 12,000; the annual economic loss due to it as not less than twenty million pounds.

Now what has been the result of the Ross treatment where it has been applied? In the Panama zone the malarial death rate in 1881 was reckoned at over 2 per cent. of the population; in 1911 it had been reduced by the anti-mosquito campaign to less than 1 per thousand. A particularly interesting case is that of Ismailia. In this town, surrounded by arid desert, there was no malaria until the year 1877, when it was introduced by infected immigrants. In 1900 there were no less than 2,284 cases. Ross himself went out to supervise an anti-mosquito campaign, and the disease was completely eliminated so far as fresh infections were concerned. The general position now is that within any restricted area malaria can be completely controlled. Scattered all over the warmer parts of the world are localities that up to twenty

years ago were deadly to the white man from the prevalence of malaria and in which now the disease has either been completely abolished or reduced to such infrequency as to become practically negligible.

But malaria is not the only one of these mosquito-borne diseases. Yellow fever is another. From time to time this disease used to make its appearance in epidemic form and do dreadful damage. The epidemic of 1821 in Barcelona cost 5 000 lives; that of 1850 in Rio cost 4,160; that of 1853 in New Orleans cost 7,970; that of 1857 in Lisbon cost over 6,000. In Brazil during a period of thirteen years the deaths caused by yellow fever were estimated at 28,078; but in the single year 1899 that country lost 35,557. It was this disease which was the most terrible enemy of the French engineers at Panama; it was impossible to estimate the total number of deaths, but the scale of loss may be imagined from such a simple fact as that "in one ship eighteen young French engineers came over and in a month after their arrival they were all dead except one" (Howard).

Now what was the result of anti-mosquito measures? In New Orleans epidemics occurred in 1853 with 7,970 deaths; in 1858 with 4,854, in 1867 with 3,093, in 1878 with 4,056. Again in July, 1905, an epidemic made its appearance, and by August 12th there were 105 cases. This time, however, anti-mosquito measures were adopted, though no doubt far less efficiently carried out than they would be to-day, and the total number of deaths was kept down to less than 500. In the Panama Canal zone after the Americans had taken it over Gorgas was able to report in 1908 that as a consequence of the anti-mosquito work not a single case of yellow fever had developed during the preceding three years.

I am well aware that to some of my audience to-night these facts that I have been quoting are all well known—they are bits of an old familiar story; why, then, should I take up your time with them? It is because I think they require driving home into the minds of the lay public, not once but again and again and again. If I had my way there would not be a child in this country allowed to emerge from his school days without facts like these being dinned into his ears until they form a permanent part of his mental equipment.

Would it not, indeed, be an immense step forward in our educational methods if we could replace what at present forms so much of the teaching of history in our schools—the more or less legendary tales of the doings of long dead kings and chiefs—by the kind of history that really matters, the history of the intellectual achievement that marks off civilized man from savage? There are no tales more fascinating, more calculated to grip the interest and the imagination, than the stories of how some of the great advances in human knowledge have been made; the stories of how the heroes of science have carried on towards their goal, undeterred by failure and discouragement, it may be in circumstances of great personal discomfort and danger. The advantage that would accrue to science is, of course, obvious: with greater knowledge would come a fuller appreciation on the part of the public of what science really means, and the whole attitude of the community towards science and its encouragement would become entirely changed.

But would there not come also an immense gain to the individual himself? Could he possibly avoid being ennobled and made into a better citizen by being brought into contact with the lives of those who have toiled and fought, not for personal glory or wealth or power, but only for truth and for the good of their fellow men?

However, my purpose just now is not to make out a case for modifying the school curriculum so as to include these chapters of what I regard as *real* history. It is rather to continue to urge the less lofty, but in a commercial age necessary, argument, that the great pioneers in medicine have conveyed to mankind possessions of untold *material* value. What exactly that material value is can, of course, never be gauged. Our vision is limited. We see only what is close at hand. And our vision lasts only during the instant of our own lives. But still can we not in imagination project our minds back during these last few decades and on into the unbounded future, and become at least dimly aware of these unnumbered invisible hosts whose individual debts are their lives, or at the least their working efficiency? Suppose we had never received the benefaction of aseptic surgery. Suppose we transport ourselves back in imagination to the days of pre-Listerian horror. And suppose that by some supernatural means we became aware of aseptic surgery existing in another planet and of all that it meant—and that it was available to mankind for purchase after a fair valuation. What would a fair price be—a million pounds, a hundred million, a thousand million? I wonder. Is not any one of these sums obviously ridiculous?

No, the price of each one of these great benefactions of medicine is beyond all the rubies of the world. It is a price that can never be paid, that can never even be fairly assessed. But the benefaction is there: it is ours: and surely it is right that we should occasionally allow our minds to dwell for a little in very reverent gratitude upon the Physician as Benefactor.

I have finished. What I have said this evening hardly merits the title of lecture. It is little more than a group of headings: The Physician as Naturalist; The Physician as Teacher; The Physician as Benefactor. But if you will bear these titles in your memory they may at least serve as pegs upon which to hang future thoughts. And even a clumsily fashioned peg is sometimes sufficient to support a rare and wonderful work.

NINETIETH ANNUAL MEETING

OF THE

British Medical Association.

Held at Glasgow, July, 1922.

PROCEEDINGS OF SECTIONS.

SECTION OF MEDICAL SOCIOLOGY.

E. ROWLAND FOTHERGILL, M.B., B.S., President.

DISCUSSION ON ALCOHOL AS A BEVERAGE AND ITS RELATION TO CERTAIN SOCIAL PROBLEMS.

(Continued from page 207.)

ALCOHOL AND INDUSTRIAL EFFICIENCY.

BY

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IN some introductory passages Professor Collis stated that he accepted the definition of alcohol set forth by the expert committee[1] appointed during the war by the Central Control Board (Liquor Traffic)—namely, that alcohol is used to mean ethylic alcohol C_2H_5OH, prepared by the fermenting action of yeast upon sugar. This is the basis of all alcoholic liquors, whether the beverage is consumed immediately after fermentation or at some later period, or whether, as in the case of brandy, whisky, gin, or rum, the spirit is subsequently distilled. Preliminary considerations might be summarized in the statement that alcohol is a substance which can supply the body with a limited amount of easily assimilated energy, but is a narcotic drug or intoxicant capable, if the dose be pushed, of acting as a poison. Alcoholic beverages have a pleasant taste and may be consumed convivially or industrially, but industrial drinking is seldom found dissociated from convivial. When consumed in high concentration the drug effects of alcohol are most pronounced.[2]

"Industry" is a word generally applied only to physical work connected with some particular form or branch of productive labour, or with some trade or manufacture. Productive labour and manufactures represent man's effort to modify his environment to his needs. Efficiency in industry means the carrying on of this productive labour with a minimum expenditure of energy, whether that energy be physical or mental, or be represented by wages paid to the workers for expending energy or by money expended on raw material or on necessary plant. Industrial efficiency is adversely affected if the return for wages paid is inadequate; if raw material is spoilt during manipulation; or if the plant is not tended so that it works to best advantage.

The subject for discussion, then, is whether the consumption of alcohol exerts any influence, and if so in what direction, upon these matters; we have also to distinguish between convivial and industrial drinking.

EFFECT OF CONVIVIAL DRINKING.

Sullivan has pointed out[3] that mortality directly due to alcohol, as measured by deaths ascribed to alcohol and diseases of the liver, places in the same group the agricultural worker (with a comparative mortality figure of 5), who if measured by convictions for intemperance cannot be held to be a great convivial drinker, and the coal-miner (with a comparative figure of 9), who by the same measure is a great convivial drinker (see Table I). For purposes of comparison

TABLE I.—*Comparison between Convictions for Drunkenness and Occupational Mortality due to Alcohol.*

Town or County.	Convictions for Drunkenness per 10,000 Population in 1911.*	Prevailing Occupation.	Occupational Comparative Mortality 1910-12 for Alcohol and Cirrhosis of Liver.
(1) Oxfordshire	6.5	Agricultural labour	5
Suffolk	11.9		
Gloucestershire	12.0		
(2) Coventry	18.1	Cycle making	8
		Motor cars	6
(3) Tynemouth	173.1	Shipbuilding	7
(4) Yorkshire (West Riding)	59.7	Coal-mining	9
Glamorgan	63.1		
Merthyr Tydvil	76 0		
(5) Stoke-on-Trent	52.4	Pottery	12
(6) Leicester	12.5	Boot and shoe	13
Northampton	16.8		
(7) Sheffield	29.9	Cutlery and scissors	12
		Iron and steel	13
		File making	15
(8) Reading	10.0	Biscuit making	14
(9) Rochdale	27.0	Cotton manufacture	14
Burnley	25.8		
Blackburn	32.8		
Oldham	42.3		
(10) Halifax	17.9	Woollen, worsted manufacture	15
Bradford	25.1		
(11) Swansea	54.3	Tinplate manufacture	16
		Copper and zinc	0
(12) Birmingham	71.2	Gunsmiths	21
		Jewellery	26
(13) Birkenhead	126.7	Dock labour	30
Liverpool	152.9		
(14) Burton-on-Trent	51.2	Brewing	49

*Data abstracted from Alliance Year Book for 1913, edited by G. B. Wilson.

these occupations may be compared with the clergy, with a comparative mortality figure of 4, or with dock labourers with a figure of 30, and costermongers with a figure of 36, or with inn servants with a figure of 51, and inn-keepers with a figure of 156. (The figures quoted are for 1910–12.) Estimated by this measure convivial drinking would not appear to exert any marked effect upon health. This measure certainly tends to mask any effect exerted upon industrial efficiency, for few employers of labour would agree that the subject of a drinking bout overnight is as good a workman as usual next day. Nevertheless I am content at this point to leave aside the question of convivial drinking, and rather direct attention to industrial drinking.

EFFECT OF INDUSTRIAL DRINKING.

The habit of industrial drinking essentially represents chronic alcoholism, but when considering the effect of alcohol upon industrial efficiency the definition of industrial drinking must be widened to include working while the system contains alcohol, whether consumed during or before working hours; for the elimination of alcohol is not immediate, but takes anything up to twenty-four hours to be complete. If this definition be accepted consideration may be given under this heading to the effect of alcohol on physical and mental activities, those activities which determine the return for wages paid, the quality as well as the quantity of output, and the attention paid to plant—in other words, which should determine industrial efficiency.

Bodily activities are of two kinds, reflex acts and volitional acts; frequently the two are combined; but the effect of alcohol may be studied by considering them separately.

REFLEX ACTS.

Two forms of reflex, the knee-jerk and the eye-closing reflex, which have been studied by Dodge and Benedict,[4] may be taken as examples. These observers found that one hour or so after taking a dose of alcohol equal to about 2 oz. of whisky or 1¼ pints of beer, the speed of commencement of the knee-jerk was retarded by 9.6 per cent., and the extent of movement was diminished by 48.9 per cent. If the dose was increased the speed reaction and amplitude were impaired still more. The more complex eye-closing reflex was found to be similarly affected as regards speed and extent of movement by similar doses; but in the case of those accustomed to control this reflex voluntarily (one subject was a boxer and another a revolver shot) alcohol weakened the acquired inhibitory control and allowed the reflex to be more active. This capacity for weakening inhibitory control probably accounts for that acceleration of the pulse rate which has been noted to follow a moderate dose of alcohol and has been quoted as evidence of a stimulating effect. In reality this acceleration represents weakening of the cardio-inhibitory tone which normally restrains the heart beat.

Study of the reflexes, then, displays alcohol as a drug which depresses. Direct evidence drawn from industry that interference with the reflex activity impairs efficiency is difficult to adduce. But indirect evidence is to be found in accident occurrence. Certain accidents actually result from or are accentuated by slow reflex action; of these the entrance of a foreign body into the eye or the withdrawal of a hand on feeling pain due to an abrasion, or on contact with hot metal, may be quoted as examples.

Some years ago Dr. Stehr[4] in Germany obtained figures showing the proportion of industrial accidents occurring on various days of the week. He found that the frequency of accidents on the average for the empire reached its highest point on Monday, and steadily declined until Saturday, which is the usual payday, when it quickly rose almost to the height of Monday. His other data showed with few exceptions that Monday stands at the top of the scale with a corresponding increase at the end of the week. In the milling trade, where Monday and Saturday changed places, payday usually falls on Friday. In Lower Alsace, where Friday stands next to Monday in number of accidents, there are many trades in which Thursday is payday. The distribution of convictions for assault in the empire which are generally ascribed to alcohol, show a weekly distribution agreeing with that for accidents; and convictions for drunkenness in Hildesheim, a city possessing most careful records, follow the same course. Dr. Stehr, after carefully weighing up

TABLE II.

Period.	Statistical Group.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Proportion of accidents occurring on different days:							
1897	German Empire	*17.6*	16.7	15.7	15.7	15.1	17.0
1885–1898	North Austrian building trades	*18.7*	15.6	15.6	16.2	16.6	16.2
1889–1899	General milling	16.7	15.9	14.9	14.6	15.9	*17.3*
1839–1893	Land and forest cultivations	*16.8*	15.9	16.0	14.7	15.6	15.5
1897 (50 weeks)	Shipbuilding concern, Hamburg	*19.2*	16.9	16.3	14.9	15.2	17.5
1838	Lower Alsace	*14.0*	← Excess over weekly average →			10.0	.....
Average convictions for assaults:							
1878–1899	German Empire	*135*	69	62	1	4	103
Convictions for drunkenness:							
1896–1902	City of Hildesheim	*224*	148	99	86	119	141

facts here quoted, as well as other evidence, concludes that the variations in accident frequency may safely be attributed to the use of alcohol, even though that use is not immoderate.

Dr. H. M. Vernon has investigated accident occurrence from this point of view,[5] taking advantage of the liquor restrictions during the war. He studied the occurrence of accidents during the first, second, and third shifts of night work. Before any restrictions existed there was the usual opportunity for drinking before starting work; at that time there were among men nearly twice as many accidents in the first spell of work as in the last, and among women 1.6 times as many. Under restrictions this proportion fell to 1.4 for both sexes (see Table III).

TABLE III.—*Ratio of Accidents in Three Spells of Night Work.*

Alcohol Consumption.	Period.	Men.			Women.		
		1st spell	2nd spell	3rd spell	1st spell	2nd spell	3rd spell
Rather less than pre-war.	February—July, 1916	1.9	1.0	1.0	1.6	1.2	1.0
74 per cent. of pre-war.	August, 1916—March, 1917	1.5	1.5	1.0	1.4	1.3	1.0
29 to 39 per cent. of pre-war.	April—October, 1917	1.4	1.0	1.0	1.4	1.2	1.0

Vernon also noted that before restrictions in 1915 there were far more accidents on Saturdays and on Mondays than on other days in the week; wages were paid on Friday afternoon. But during 1916–17 the number of accidents was nearly the same on each day of the week; during this latter period shorter hours provided opportunity for spending money on drink on any day of the week, and at the same time restrictions were limiting the amount of alcohol available. This evidence receives confirmation from America, where the National Steel Construction Company report[6] that whereas previous to the Prohibition Act, which came into force in July, 1919, 75 per cent. of accidents occurred on Monday and Tuesday, now the percentage of accidents is no higher at the beginning of the week than at the end.

The evidence thus far refers to the effect of alcohol upon the distribution of accidents; the inference being that the unequal distributions noted are due to the influence of alcohol in sending up the accidents at certain periods. The real test of course is the absolute prevalence of accidents occurring. Here some useful data are available[7] from the Department of Labour and Industry, Harrisburg, which show the number of fatal accidents in the last six months of each year for 1916, 1917, 1918, and 1919, only the last period falling within the provision of the Prohibition Act. The fall in that period, following upon a steady rise in the previous years, is marked; further, it occurred during a period of unusually good trade.

Industrial Accidents (Fatal).

Last six months, 1916	1,454
Last six months, 1917	1,537
Last six months, 1918	1,647
Last six months, 1919	1,238

Further definite evidence comes[6] from the United Pocahontas Coal Company, who state that:

"Our mines are in West Va., and we have had Prohibition there for about five years. We have had better service from the men than ever before; and, better than anything else, the accidents have been only about one-third as many. And when you think that the deaths by accident are but one out of three of what we had before we had Prohibition, it seems to me that anyone that loves his fellow man will favour the cause of Prohibition."

The President of the Gulf States Steel Company[8] has written that accidents in the plants of that company have been reduced since prohibition went into effect by at least 75 per cent.

Deduction.—The depressing effect of alcohol upon reflex acts is detrimental to efficiency if industrial accidents are used as a measure.

VOLITIONAL ACTS.

The efficiency of a willed act may be estimated in several ways: (1) by the power of the muscular effort; (2) by the ability of the subject to continue the effort—that is, to resist fatigue; or (3) by the accuracy of the effort having regard to its purpose. No definite evidence has been acquired under industrial conditions of the effect of alcohol upon the efficiency of willed acts as measured by either of these methods of estimation. Indeed, the requisite conditions for obtaining such industrial evidence are practically impossible to find or establish.

Experimental Evidence.

Evidence bearing on the subject is, however, forthcoming from laboratory research. The investigations of Rivers[9] are probably known to all; they were aimed at testing the effect of alcohol upon muscular contraction—namely, pure muscular fatigue. He used the ergograph and employed cleverly contrived control experiments; his results agree with those of earlier observers in failing to demonstrate that moderate doses of alcohol exert any appreciable influence upon simple muscular contraction. They also agree well with the indication to be drawn from Mellanby's later work that alcohol is not a source of energy for muscular contraction. This point is important since, if the combustion of alcohol only supplies heat to the body and not energy for the contraction of muscles, any claim is removed that alcohol is of use to the industrial worker, on account of its value as a partial food. Mellanby further found evidence that if the concentration of alcohol in the body is high the oxidation of other sources of energy is thereby limited when intermediate oxidation products accumulate and as a consequence expedite the onset of fatigue. He also noted that alcohol passes into the blood more rapidly if taken on an empty stomach, and that food, and especially cream, if consumed at the same time delays absorption.

The influence of alcohol upon the nervous tissues may be tested through neuro-muscular co-ordination. This aspect has received attention from Vernon and others.[10] They found that a quite moderate dose, such as a glass of wine or a pint of beer, was invariably followed by a reaction in the direction of diminished control of the muscles. No initial improvement, even of brief duration, was experienced; and the reaction was about twice as great if the dose was taken on an empty stomach. They conclude that

"in all work with the hands requiring skill and delicacy of muscular control one may be confident that, whilst strictly moderate quantities of alcoholic liquors taken by persons accustomed to alcohol may not appreciably reduce manual skill, they can seldom, if ever, improve it. Moreover, such persons continually run the risk of finding their manual skill quite appreciably reduced if they happen to take their alcohol on an empty stomach instead of a full one. It would be far better for them to avoid the risk altogether by postponing their consumption of alcohol till the day's work is over."

Particular interest attaches to another inquiry, carried out by McDougall and Smith,[11] who, after investigating the action of various drugs, group alcohol with chloroform, and consider that both act chiefly and immediately by raising the resistance of the synapses in all parts of the brain, so impeding nerve impulses. True stimulants such as strychnine and tea produce opposite effects. These observers also noted a new point—namely, that although alcohol acts deleteriously during the stages of increasing inefficiency caused by protracted fatigue, yet it acts beneficially as the subject begins later to regain his previous efficiency. This instance, which is the only one of alcohol improving efficiency, may have its importance in relation to recovery from overfatigue in industry; but since overfatigue should be avoided the value of alcohol with respect to it ought not to be needed.

Throughout the experimental work referred to one point is frequently noted—namely, that the subjects when reacting to alcohol were generally under the impression that the test was being performed unusually quickly and accurately, and could with difficulty be convinced to the contrary even when faced with the results. This point in itself indicates the narcotic influence of alcohol upon powers of judgement and discrimination.

These observations prepare the way for considering evidence gathered from industrial experience of the effect of alcohol upon efficiency.

Industrial Evidence.

Evidence from industrial experience is difficult to establish on a scientific basis. Experience during the war, when liquor restrictions were in force, might have afforded useful records had not other influences, such as long hours and pressure of work, also been at work simultaneously.

Appeal is often made to records of *lost time*, and the opinion has been expressed that this interference with industrial efficiency is markedly influenced by alcoholism. There can be little doubt that there is reason for this opinion. Lost time varies greatly in different industries; it tends, for instance, to be high in coal-mining, ship-building, metal-smelting, and dock labour, and these are all industries in which convivial drinking is high. Yet the evidence is not clear; for in these industries, owing to the need for physical fitness, a worker may wisely stay at home on account of some minor disability, such as a slight sprain or rheumatism, which, if he were a tailor or printer, he would disregard. Again, fatigue engendered by hard physical work or adverse conditions of employment may be a direct cause of turning to

alcohol; and so industry may tend to increase that alcoholic habit which, in its turn, acts detrimentally upon lost time. Apart from factory conditions and the amount of physical energy demanded, lost time is particularly influenced by the distribution of working hours; and Loveday has shown[12] that in comparatively light engineering work, when work is started before breakfast, the amount lost—10 to 20 per cent. of possible hours—may be as high as that which prevails in coal-mining, while if before-breakfast hours are not worked lost time is three or four times less in amount. Factory cannot, then, be compared with factory, or industry with industry, with regard to the alcoholic habits of the workers and the amount of time lost, unless information is available as to hours of work, the nature of the work, and the conditions of employment. Hence the difficulty of estimating accurately the effect of alcohol upon lost time.

Nevertheless Loveday, when investigating time lost before breakfast, found that Monday is universally the worst day. Stehr, whose work has already been quoted,[1] has pointed out that absenteeism resembles the occurrence of accidents in not being distributed evenly throughout the week. He gives the following figures for a colliery in Moravian Austria:

Days.	Percentage of Absentees.	
	1898.	1899.
Usual week-days	5.0	6.9
Days following Sundays and holidays ...	7.5	9.3
Days following advance pay-days	8.9	10.4
Days following regular pay-days	10.4	12.9

Although more recent investigations into industrial fatigue may call for some modification of the interpretation Stehr places upon the data quoted and other evidence he obtained, he does establish that a day of recreation is frequently more "fatiguing" than a day of work, and that this phenomenon is most pronounced among habitual drinkers. In view of other evidence he is probably justified in attributing much of the loss of efficiency so indicated to the use of alcoholic beverages.

The best evidence is probably that forthcoming under prohibition from America, where the only variant has been the opportunity for obtaining intoxicating drink.

Thus the Chesapeake Marine Railway Company report[6] that: "Prior to Prohibition we always had what was known as Blue Monday in shipyards; there being so many workmen absent that it was a hard matter to carry on the work of the yard with any degree of efficiency. With Prohibition in force, we can accomplish as much on Monday as any other day."

The Kittanning Iron and Steel Manufacturing Company[6] say: "In our puddle mill department, for the first turn or so after each day, we seldom had more than 25 per cent. of our furnaces in operation; the number on each turn increasing towards the end of the week. Since Prohibition went into effect, we have found that between 90 and 100 per cent. of our men work practically full time, the only losses being due to possibly sickness or some element beyond the control of the men."

The Spang, Chalfant and Company,[6] who represent yet a different industry, declare that: "Monday mornings and Monday nights in the mill were periods of great difficulty and anxiety, because the week end drinkers would be absent from their posts of duty in such numbers as to make the operation of the mill almost impossible, and difficult at best. After the saloon was abolished this trouble disappeared."

A mining engineer at Iron River reports[8] that: "At our mines for the first nine months after the State of Michigan went dry the number of days of absence from work due to accidents fell off 68 per cent. This seemed so startling to me that I made an inquiry in a large organization near by and their results were practically the same."

These statements might be multiplied without materially strengthening the proposition that alcohol consumption conduces to lost time and so interferes with industrial efficiency. Before, however, leaving this point regard should be paid to the prevailing custom of paying wages at the week-end, just when the worker is tired and has free time ahead for indulging in alcoholic recreation. Probably lost time on Mondays would be greatly reduced by paying wages on Monday evening, a scheme put forward by Vernon as advantageous from other points of view.

Another great cause of lost efficiency is *labour turnover*. The financial loss so caused was crudely estimated[13] at the meeting last year at Newcastle. No evidence is forthcoming from this country as to how labour turnover is influenced by alcoholism; nor, indeed, is it directly obvious that such an influence must exist. Nevertheless the Appleton Company, Lowell, Mass., consider[7] that since prohibition their labour turnover has been reduced. So few industrial concerns ever consider the importance of labour turnover or calculate its amount that this statement has significance. As a set-off, however, the findings at Grand Rapids[14] must be quoted that the change has made for restlessness, especially among the younger workers, and in some cases it has slackened effort and swelled the labour turnover.

Lost time and labour turnover are, after all, only indirect methods of measuring industrial efficiency. The true test must be *work done*. Here, for lack of other evidence, we must turn again to America. A few statements made by firms representing different industries bear on the point.

J. Edward Horn and Company state[6] that: "When our war-time Prohibition went into effect, July 1st, 1919, we immediately saw big changes in the production of bituminous coal by our miners. As time passed we realized that each miner was producing more coal per day and worked far more regularly than he did when he was able to get strong drink."

The Potts Run Coal Company remark[6] that the efficiency of men has increased about 25 per cent.

The Ashland Steel Company have written[6]: "We beg to advise that we operate a Bessemer steel plant and wire rod mill. Since Prohibition has been effective in this country our scrap loss in our rod mill department has been reduced 25 per cent., and we have a better character of workmen than ever before."

The American Locomotive Company hold[6] that prohibition has caused considerable efficiency in all departments. The Sun Shipbuilding Company maintain[6] that their men "are worth 20 to 50 per cent. more to their company on account of their ability to give better services."

Alcoholism and Food.

Alcoholism affects industrial efficiency indirectly through yet another channel. The energy needed for industrial activity is obtained from food; but where the alcoholic habit prevails appetite is interfered with and wages are spent on drink which should be spent on food. Interest attaches to expenditure in the United Kingdom on food and on alcohol. The comparative figures for 1919 were as follows:[15]

Food.	Per head. £ s. d.
Beef and mutton	4 4 8
Bread and flour	3 11 8
Milk	2 14 4
Bacon	2 3 5
Butter and margarine	1 17 0
Sugar	1 1 8
Total	15 12 9
Drink.	£ s. d.
Alcoholic drink	8 8 0
Tea	0 19 7

Certain foods, such as fruits, vegetables, eggs, cheese, and potatoes, are not included in the expenditure stated; probably they may fairly be included at something over £1—say, for convenience, £1 3s. 3d. Then the comparative expenditure on food would be £16 16s., or only twice as much as is spent on the harmful luxury alcohol. These figures are referred to because the proportion of income spent on alcohol is greater as the social status of the spender is lower; in other words, manual labourers who expend energy and need more food to supply it, spend proportionately more on alcohol than do non-manual workers; and efficiency suffers.

Conclusion.

Alcohol possesses a charm for removing the irritating effects of industrial fatigue, but it is a charm purchased at great cost to efficiency. The evidence drawn from American sources as to the beneficial effect upon industrial efficiency of prohibition when taken as a whole can hardly be controverted, even though it may be criticized piecemeal.

Throughout the United States prohibition was established on July 1st, 1919, but some of the States went dry before then—for example, Kansas thirty-five years before, North Carolina in 1908—and the movement was spreading. Over here before the war the competition of America was being keenly felt, and the question was often asked how it was that in the States, although higher wages were paid, yet goods could be produced cheaper. Clearly their industrial efficiency was higher. If this greater efficiency depended in any way upon partial prohibition, it may become far greater under total prohibition. This country depends upon her industrial efficiency. All evidence points to this efficiency being materially affected by alcoholic habits. The time is not far distant, if it is not now with us, when, in the interests of efficiency, we may be compelled, if those habits are not rapidly brought within temperate limits, to follow the example of America.

SUMMARY.

1. Alcohol is a drug possessing energy which the body can use, but probably not for muscular work.

2. Alcohol interferes adversely with reflex acts and neuro-muscular co-ordination. The higher the concentration in which it is consumed the more pronounced is the effect.

3. Alcoholic habits vary with industries, and where most pronounced time-keeping is most irregular.

4. Industrial accidents are increased by the consumption of alcohol even though in moderate amounts.

5. There is no evidence, either experimental or practical, that alcohol is advantageous to industrial efficiency, and much that it is harmful.

6. Prohibition in America appears to be associated with greatly improved industrial efficiency, whether measured by accident frequency, lost time, or output.

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ALCOHOL RESTRICTION AND MORTALITY.

BY

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WHEN the total blockade came into effect in February, 1917, a very critical position developed in Denmark, as will be seen from the following figures:

Average Yearly Crop (Millions of Kilograms per Million Inhabitants).

	Germany, 1912-13.	Denmark, 1913-16.	Denmark, 1917.
Rye	175	105	76
Wheat	66	68	40
Bread grains	241	173	116
Barley	54	204	132
Potatoes	767	349	294

As we in Denmark before the war used to import nearly as big a quantity of grains as our own crop, and as our crop in 1917 on account of the drought was greatly reduced, one can easily see that the situation was very critical—indeed, a catastrophe was really pending. The situation seemed the more critical as we knew that the Germans were starving, in spite of the fact that Germany under ordinary circumstances raised 50 per cent. more of bread grains and over twice as many potatoes in proportion to its population.

It was a great satisfaction to me to be called upon to act as a member of the committee appointed to deal with the question together with Professor Holger Mollgaard and to share with him the responsibility for the physiological side of the question. Here we really would have a very rare opportunity for an exceptional experiment with three millions of people. Nothing could really be easier than to procure sufficient nourishment, if only the newer principles of nutrition were followed and the bill of fare made up principally of milk and vegetables. We recommended especially potatoes and barley porridge. Extensive experiments carried out in the laboratory of which I am the head have proved that young and strong men may live year in and year out exclusively on potatoes* and margarine or exclusively on barley porridge, sugar, and margarine, and continue in perfect health and vigour with a splendid capacity for work.

It is further proved through our experiments that a person may live for two years or longer in excellent health and good working capacity without fat if he only gets sufficient fruits and green vegetables, which contain the same vitamins as are found in butter. Further, we have proved that man can digest the bran of wheat and rye to the same extent as it is digested by the domestic animals. This seems to disagree with older experiments, but these were presumably not carried out in the right way—the mistakes can easily be demonstrated. Our experiments with bran have been repeated by Professor Johansson of Stockholm and Professor Wiegner of Zürich with quite similar results. Bran is, after all, one of our very best foods. Persons that I have employed in experiments have lived half a year on whole wheat bread (or rye bread) and margarine only. When the same persons tried to live upon white bread and margarine alone they became so weak after three weeks that they could hardly walk.

The said committee calculated that to produce pork and bacon by the help of barley and potatoes meant a loss of nourishment of 80 per cent., and such an extravagance would under the circumstances be perfectly unjustifiable. We also found it perfectly unjustifiable to use the same good foods for the production of alcoholic drinks. Space will not permit to go into details; I will only mention that the unanimous propositions of the committee were adopted by the Danish Government and Parliament. Professor Mollgaard had the main responsibility as far as the practical administration was concerned, and the speaker was given the task of writing a pamphlet of direction for housewives. This pamphlet was printed in an edition of 40,000 copies and sent out by the Government. The ration system was in its essentials carried through in Denmark without any particular opposition. People entertained no anxiety as to being undernourished.

Our chief measures were:

1. All bread cereals and most of the barley and potatoes were requisitioned by the Government to be used as food alone for the people.

2. As a result of this measure the raising of pigs was reduced to one-fifth. The small amount of pork which was available was eaten by the farmers. The city folk got hardly any pork.

3. The rye was ground out to 100 per cent., and thus rye bread contained all the bran. In addition to this, 12 to 15 per cent. bran of wheat was mixed into the baking of rye bread—that is to say, all the bran which was left over in making white bread was made use of in this way. Because of this the domestic animals had no bran in their feeds while the ration system was in force.

4. All production of alcoholic liquors for general consumption was prohibited. All supplies on hand were seized, and of the supply only 100,000 bottles (each containing 750 c.cm.) were given out every month, which meant 25 c.cm. of alcoholic drink for each person a month. In order to avoid any special fight for this dram, there was placed so high a tax on spirits that the price went up to an amount twenty times higher than was normally paid.

5. The production of brewing of beer was reduced to one-half the ordinary output, and the amount of alcohol contained therein was not allowed to exceed 3 per cent.

6. In addition to these regulations all export of fruit and vegetables was prohibited.

Through these measures we easily succeeded in making sufficient food available, and none needed to starve. In fact, we had a surplus of bread grains, so that we were able to render assistance to our needy neighbouring nations. But our bread-porridge-potato bill of fare did not appeal to the palate of our people as did the old meat diet, and as a result a reduction in weight of from 2½ to 5 kilograms was quite common.

The question which now presented itself was, What effect would this diet, which contained such small amounts of albumin, fats, and alcohol, have on the general state of health? We have made this matter a subject of a thorough-going statistical investigation, and we have made use of the mortality ratio as a standard.†

* An important point in this respect is that the water in which the pared potatoes are cooked shall be taken (as a soup) with the potatoes, especially on account of the vitamins.

† M. Hindhede, *Beretning til Indenrigsministeriet om Rationeringens Virkning paa Sundhedstilstanden.* [The influence of the rationing on the health. Report to the Minister of the Interior.] Short résumé in English. (Kobenhavn, 1920. Jakob Lund.) This work has been critically examined by an expert statistician, Professor Harald Westergaard, who in the preface writes: "By the request of Dr. Hindhede I have gone over the manuscript of his researches on the influence of rationing on the state of health of the Danish people, and I do not hesitate to say that in my opinion the research has been carried through on a perfectly scientific basis, and that the conclusions drawn by the author agree very well with the observations at hand. It seems to me desirable that the main result should appear in a language universally understood." The investigation reaches to the end of the year 1918. The figures are here made available to the end of 1921.

The Effect of Alcoholism upon Mortality.

This will clearly be seen from the following figures:

Yearly Consumption of Alcohol per Head in Litres (Denmark).

	1900–09.	1910–14.	1915–16.	1917.	1918.	1919.	1920.	1921.
Spirits (50 per cent.) ...	11.3	9.2	8.6	2.6	0.4	1.0	1.5	1.1
Pure alcohol in spirits, beer, and wine	7.8	6.6	6.2	3.2	1.5	2.3	2.8	2.5
*Cases per year in Copenhagen of—								
Delirium (reported) ...	760	565	390	124	14	11	17	20
Deaths from alcoholism	100	82	50	18	2	5	14	17

* Calculated per 500,000 inhabitants.

According to the old physiological views the theory was taught that a diet poor in albumin lowered the power of resistance against disease. While there was a drop in the death rate from alcoholism it was therefore difficult to know beforehand whether the total mortality would rise or drop. If the new theories were reliable then one might expect to find a falling off also in the total mortality. Unfortunately, however, the investigation was interrupted by the influenza epidemic which began to show itself in July of 1918, but did not get hold seriously till the last quarter of the year, but continued, with abating force, through 1919 and 1920. We have endeavoured to eliminate this interruption in two ways: (1) I have compared the death rate after the deduction of the figures for epidemic diseases; (2) I have made a special calculation for the year from October 1st, 1917, to October 1st, 1918. This year is the most typical of the years under the rationing system, as the most stringent measures were put in force on October 1st, 1917, and continued through 1918, until they gradually went out of effect in 1919. Alcohol restriction was already put in force in March, 1917. During the year of the rationing system only 100,000 bottles of spirits were given out each month, but in the fourth quarter of 1918 the allowance was raised to 300,000 bottles (the people had to have their Christmas spirits!), and this allowance has since been followed (see the figures below, also Diagram II).

Average Yearly Deaths per 100,000 in Copenhagen, Ages 25 to 65 Years.

	1900–09.	1910–14.	1915–16.	1917.	Oct., '17–Oct., '18.	1918.	1919.	1920.	1921.
Men.									
A. All diseases ...	1,455	1,369	1,386	1,236	985	1,426	1,201	1,212	953
B. Epidemic diseases	49	36	42	38	50	458	240	295	28
C. = A *minus* B ...	1,406	1,333	1,344	1,198	935	968	961	917	925
D. Tuberculosis and pneumonia	379	325	358	360	269	285	225	191	185
E. All other diseases (C *minus* D)	1,027	1,008	986	838	666	683	736	753	740
Ratio (1910–14 = 100)	102	100	98	83	66	68	73	75	74
Women.									
A. All diseases ...	858	886	899	899	760	1,113	971	973	773
B. Epidemic diseases	41	30	36	33	40	357	171	205	31
C. = A *minus* B ...	817	856	863	866	720	756	800	768	742
D. Tuberculosis and pneumonia	186	185	175	211	161	164	136	150	121
E. All other diseases (C *minus* D)	631	671	688	655	559	592	664	618	621
Ratio (1910–14 = 100)	94	100	102	97	83	8	99	92	92

Taking as our starting point the last five years before the war (1910–14), when the death rate was lower than ever before, we find, when we only take the male population into account and exclude epidemic diseases (B), from October, 1917, to October, 1918, a drop of 398 deaths, or 30 per cent. (C). A little increase is observed in 1919 and 1920, but in 1921 when the influenza epidemic is gone we find the death rate is still a little lower. The last drop, however, is due to the decrease in other diseases of infection, tuberculosis and pneumonia (D). Whether this drop has anything to do with the ration system cannot be stated with absolute certainty. The mortality has been on the decrease in the case of these diseases during the last generation. During 1890–99 the figures were 496, while, as will be seen, they had dropped 171 in 1910–14. The increase which was observed during the first years of the war can easily be explained because of the poor housing conditions and the scarcity of fuel. People had to crowd together in small rooms. While the same difficulties continued in 1918 we see a considerable drop in the death rate. From this we are justified in arriving at the conclusion that the diet, consisting mostly of vegetables, does not seem to have lowered the power of resistance against tuberculosis.

Because of many other factors which have to be reckoned with in this conjunction, we believe it to be correct, in order to make the effects of the rationing system clear, to subtract the last figures—that is, not to take the infectious diseases into account. By doing this we arrive at the figures as stated under E, which in the case of men from 1900–16 seem to be about constant until the rationing system was put into effect, when they drop 34 per cent., followed by a rise in 1921 of 8 per cent. In the case of women we can trace a rise during the first sixteen years of the century, but during the time of the rationing system we observe a drop of 17 per cent., followed by a new rise till 1921.

It will be noticed that the drop in the case of men is extraordinary. It cannot be an accidental year variation. When we take the figures for each year from 1900–16 we find that the figures in regard to "all other diseases," E, vary but 7 to 8 per cent. over or below the average. 34 per cent. is altogether too far outside the border of variation. There must be a reason for this, but what? There may be several reasons, but everything indicates that the main cause can be found in alcohol restriction.

1. The drop and the rise harmonize in the main with the decrease and increase in the consumption of alcohol. The objection can be made that in proportion to the drop in the use of alcohol the death rate from 1900–16, as far as men are concerned, ought to have been larger. In the case of women we find that there has been a noticeable rise. This fact, however, is not conflicting with the drop in the consumption of alcohol. The use of alcohol among women has, without doubt, been increasing, while it has been on the decrease among men. It is evident that especially among the so-called better or upper class of society it has become fashionable for the women to take spirits. It is very noticeable, too, that tobacco smoking is rapidly increasing among the fair sex.

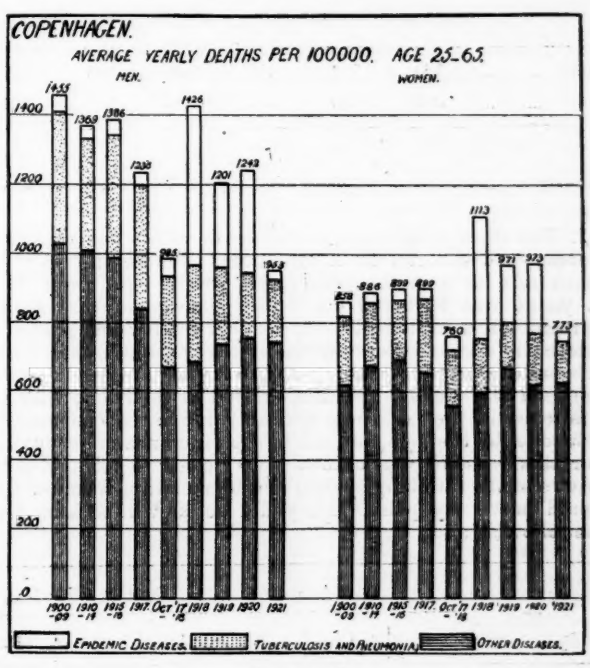

DIAGRAM I.

The increase and decrease in the use of tobacco and coffee will be seen from the official figures which cover the import of these articles. (See diagram II.) It should be observed that import and consumption do not always cover each other,

because of the fact that great supplies of tobacco were on hand and large quantities of tobacco were raised in Denmark during the war. Tobacco could for this reason always be had, while we had to be content with substitutes for coffee.

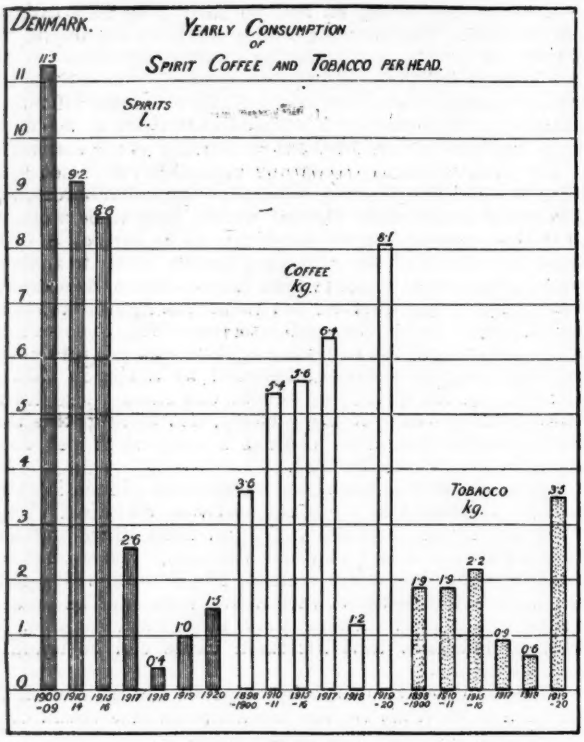

DIAGRAM II.

Denmark ranks normally next to Holland as the heaviest users of coffee in Europe, while the Englishman drinks an incredible amount of tea. The consumption per head in kilograms in 1913 was:

	Holland.	Denmark.	Belgium.	France.	Germany.	England.
Coffee	8.60	5.50	5.14	2.90	2.44	0.27
Tea	0.88	0.10	0.03	0.03	0.06	2.99
	9.48	5.90	5.17	2.93	2.50	3.26
Tobacco ...	3.56	2.20	2.61	1.11	1.50	0.94

2. The difference between the death rate among men and women was reduced to a minimum. Before the war the death rate of men in Copenhagen, in the ages from 25 to 65 years, was 50 to 60 per cent. higher than that among women. In a statistical work which I already had published before the war and made for the Sobriety Commission, I had, in conformity with others who have been doing research work on the alcohol question, arrived at the result that the difference in the main was probably due to the consumption of alcohol by the men, and not to the difference of occupation. For this reason I was naturally very eager to get hold of the results of the rationing system and to ascertain whether they would prove my point. They did so, as will be seen from the following:

	1910–14.			October, 1917–18.		
	A.	C.	E.	A.	C.	E.
Men	1369	1333	1008	985	935	666
Women ...	886	856	671	760	720	559
Difference ...	483	477	337	225	215	107

The difference, as will be observed, amounts either to one-half or one-third. In fact, if the death rate among the women had not fallen off, the difference would practically have disappeared.

	A.	C.	E.
Men, October, 1917–18	985	935	666
Women, 1910–14	886	856	671
Difference	99	79	+ 5

It is probable (compare the experiences of the English life insurance companies) that if the rationing system had been continued in the same manner the men would have overtaken the women—in fact, the possibilities are that the figures would have gone below the figures shown for women. This would mean that the death rate among men would have been reduced to one-half its former size. What this would mean for families, as well as for society in general, needs no further explanation.

But the most surprising is, in my opinion, not the reduction in the rate but the rapidity of the reduction. The most natural explanation of this seems to be that the effects of alcohol are not limited to drunkards only. It must be evident that the main effect lies in a lowered power of resistance also through a moderate consumption of alcohol, and therefore those who drink alcohol in moderate quantities die like flies when disease sets in. But the question might be raised, Is alcohol restriction the only cause of this remarkable reduction? I hold that the change of diet also plays an important part, and my supposition is based especially on observations made with reference to the death rate during the latter years of life.

Death Rate in Copenhagen at Ages 65 to 100.—Average Yearly Deaths per 100,000.

	1900–09.	1910–14.	1915–16.	1917.	Oct.,'17–Oct.,'18.	1918.	1919.	1920.	1921.
Men.									
A. All diseases ...	910	872	904	926	674	682	794	875	820
B *plus* D. Infectious diseases	96	70	85	68	42	56	57	58	48
E. All other diseases	814	802	819	853	632	626	737	817	772
Ratio (1910–14=100)	101	100	102	107	79	78	92	102	96
Women.									
A. All diseases ...	699	706	786	778	619	622	654	745	720
B *plus* D. Infectious diseases	67	54	64	52	31	36	47	44	28
E. All other diseases	632	652	722	726	588	586	607	701	692
Ratio (1910–14=100)	97	100	111	111	90	90	93	108	106

Under the heading of infectious diseases are gathered all deaths from epidemic diseases, tuberculosis, and pneumonia. These diseases play a comparatively small part in old age. We find practically no deaths here from influenza. When we consider, as stated before, Group E, we find in 1918 a reduction of 21 to 22 per cent. in the case of men, and 10 per cent. in the case of women. The death rates of men and women come closer together. This may, of course, be due to alcohol restriction. But there is something else which does not harmonize—namely, the rise in 1920-21, and especially the rise in the case of old women. We cannot suppose that they consume very large quantities of spirits. In order that this problem might be solved, I have investigated the death causes which particularly might be the cause for this increase during the last two years. The answer is: *Heart diseases, bronchitis, bronchopneumonia, and senility*—that is to say, the real old-age death causes.

We notice how these old-age ailments invariably and regularly decrease both in the case of men and women during the time of rationing, while they return to normal as soon as the rationing system is abolished. Practically speaking, we find no difference between deaths of men and women in these diseases. From this we gather that there must be some cause for this invariable drop and rise, but it cannot be that alcohol is the guilty one. But where is the cause to be found then? I make my guess, On the Spartan, spare diet, together with the scarcity of coffee. I have no doubt but that it is advisable and wise, especially for old folks, who as a rule live

a comparatively quiet life, to eat but little, and it is not at all improbable that a lacto-vegetarian diet here is greatly to be preferred.

Three Main Causes of Death in Old Age in Copenhagen.
(Deaths per 10,000.)

	1900-09.	1910-14.	1915-16.	1917.	Oct., '17-Oct., '18.	1918.	1919.	1920.	1921.
Men.									
Diseases of the heart	108	123	136	123	89	85	106	120	115
Bronchitis, etc.	124	108	138	149	90	87	107	131	91
Senility	106	103	116	109	60	83	118	137	131
Total	338	334	390	381	239	255	331	388	337
Women.									
Diseases of the heart	99	121	137	134	99	102	113	112	127
Bronchitis, etc.	116	101	122	132	71	85	101	110	87
Senility	112	121	122	120	89	92	108	158	165
Total	327	343	381	386	259	279	322	380	379
Difference (men *minus* women)	+11	−9	+9	−5	−20	−24	+9	+8	−42
Ratio (1910-14 = 100)									
Men	101	100	117	114	72	76	99	116	101
Women	95	100	111	113	75	81	94	111	111

We can dispute the explanations, but the fact remains nevertheless that in Copenhagen, a city of about half a million inhabitants, 1,100 people over 25 years of age were saved during the time of the rationing system when we compare the figures with 1910–14. For the entire country, with a population of three millions, the saving of life for all ages amounted to 7,500, or if we reckon in proportion to the year 1913, the year the death rate was at its lowest, the figure stands at 6,300. In other words, the death rate for the entire country dropped from 12.5 to 10.4 per thousand, which is the lowest mortality figure that has been registered in any European country at any time. This is, therefore, probably the greatest hygienic advance ever made in so short a time. All hygienic measures are as a rule expensive, but the rationing system not only did not cost anything, but through our inexpensive diet and economy in regard to the use of alcohol the country saved hundreds of millions of kronen.

We have spoken only of the death rate, and have not touched upon the moral advantages which alcohol restriction has carried in its train. But anyone who will look at the figures presented can judge this for himself. It must be remembered that Denmark, as far as the mortality rate is concerned, already was one of the most favourably situated countries in Europe, and this notwithstanding the fact that 40 per cent. of her population was located in the cities. What it would mean to the larger nations, if through a similar mode of living they reduced their death rate to 10.4 per thousand, is self-evident.

Country.	Consumption.		Inhabitants (Millions).	In Cities per cent.	Mortality rate per 1000 (1913).	No. saved if Mortality is 10.4.
	Alcohol (100%) (Litres).	Spirits (Litres).				
France	22.4	7.9	40	41.3	17.7	292,000
Great Britain and Ireland	9.3	3.5	47	63.2	14.3	183,000
Germany	6.7	5.8	68	47.2	15.0	313,000
Denmark	6.0	9.2	3	40.2	12.5	6,300
Sweden	4.2	6.7	5.7	27.2	13.7	18,800
Norway	2.7	3.4	2.5	28.5	13.2	6,500

Why should it not be possible in beautiful France, where the ratio of city and country dwellers is similar to that of Denmark, to bring the mortality rate down to a level with that of Denmark, such as was demonstrated during the rationing system there? If it were carried through, 300,000 lives would be saved annually—that is to say, the growth of the population would increase from 1 to 8 per thousand, and the critical question of repopulation in France would be solved.

C

The weak point in the Danish experiment lies in the fact that we not only restricted our alcohol consumption but we changed our entire mode of living. I would recommend to the British people that they should stop all production and consumption of alcohol for the next two years and continue to live as heretofore. If no essential difference is found with reference to the mortality rate at the end of this period, then I would say, keep on quietly and unconcernedly with your drinking. But should it be proven, against expectations, that 50,000 to 100,000 lives were spared, then I suppose that no intelligent and sensible man would wish to re-establish full liberty in a poison so dangerous. This is, at any rate, the situation in Denmark. There are hardly any, except the distillers and brewers, who desire to return to the old conditions, and the fight will be between prohibition and a strong rationing system.

DISCUSSION.

Sir THOMAS OLIVER (Newcastle-upon-Tyne) said that there was little doubt that within the last fifty years all classes of society in this country had been marching towards sobriety. He compared life in the army four decades ago with the conditions prevailing to-day. The men were better paid, the discipline was more humane, the recruits were drawn, if anything, from a better class of society, or at any rate were better educated; also they were worked harder and had not so much time on their hands as their predecessors. He questioned whether the modern recruit could go through the hard training required of him if he consumed beer to the extent which was customary in former days. The same was true of the navy. Thirty years ago it was the common custom for many of the seamen who had been given leave of absence to return to their ship in a condition of physical unfitness from drunkenness; this was no longer so. A similar improvement was observable in the merchant service, although there were still many defaulters. In the field of industry absenteeism on Mondays was still one of the discomposing circumstances which employers had to face, and no doubt free indulgence in alcohol over the week-end was responsible. The amount of drink consumed was influenced to some extent by the state of the labour market. When casual labour was scarce the men who found employment received larger wages and were apt to spend more on drink. While high wages tended to social and moral betterment there were exceptions, in which high wages, especially for youths, laid the foundation of drinking habits. No wages at all, however, might be equally harmful, and week after week men who were receiving the dole were brought before the bench for drunkenness. A great responsibility rested upon foremen and heads of departments in the factories, since by their example the habits of the younger men were influenced. There were certain occupations in which the workpeople drank more than in others—occupations which had to be carried on in high temperatures or in humid atmospheres, causing perspiration, or in dusty trades, causing dryness of the throat. Each industry should tackle the question for itself. Many works canteens, offering cheap, wholesome food without stimulants, had gone far to solve the problem. More facts were needed, slowly accumulated and carefully tested, as to the extent of unfitness for work which alcohol produced in those who consumed it freely. The speaker quoted some figures which showed that in a coal-mine in South Wales the teetotal miners sent to bank 100 tons of coal for every 72 sent up by miners who indulged too freely in alcohol; also that in an electrical engineering works in the South of England, where all the employees were abstainers, the absenteeism only averaged 0.5 per cent., and the accident claims 8 per cent. of the premiums paid, whereas in workshops generally accident claims formed 66 per cent. of the premiums paid. Sir George B. Hunter, of the shipbuilding firm of Swan, Hunter, and Richardson, had given him the comparative number of hours worked by riveters who were abstainers and riveters who were known to be unsteady. The investigation extended over three weeks and included overtime. The average number of hours worked per week by six total abstainers was 67, 62, 61, 70, 70, and 55; and by four men who were known to be unsteady, 45, 51, 43, and 29. The number of hours worked overtime by the first six was 14, 11, 6, 16, 17, and 6, and by latter four, 16, 10, 3, and 3. Aschaffenburg showed that alcohol lessened the amount of work done; his experiments with the ergograph showed that before the alcohol which had been consumed had had time to lessen the amount of work done there was usually a primary but short-lived increase, as indicated by a larger number of movements

in a given time, but not an increased force or range of movements; there was increased speed without effectiveness. Once it was absorbed into the system alcohol acted upon the brain and spinal cord much in the same way as the products of fatigue, by dulling mental activity. With alcohol, as with other drugs, there was individual idiosyncrasy; in some persons it induced degenerative changes more rapidly than in others, but from these degenerative changes total abstainers were not altogether exempted. Long before these changes were established, however, repeated imbibition of alcohol had been slowly deranging the functional activity of the higher centres of the brain, whereby co-ordination of the muscular movements had become impaired, and the response of these centres to ingoing stimuli less prompt. This condition of the nervous system underlay many of the accidents which occurred in factories and shipyards, and for these, therefore, indulgence in alcohol must be regarded as more or less responsible.

No man could do his best, or even any reliable work, after the free use of alcohol. If as a result of the gigantic experiment which at present was being carried out in the United States of America that country was likely to secure a world lead in commerce and industry, then, for the sake of our own people and the future of the empire, some changes would have to take place in the drinking habits of the nation.

The Rev. C. F. TONKS (Organizing Secretary of the Church of England Temperance Society) said that the licensing statistics, just issued, for 1921, confirmed Dr. Sullivan's statements with regard to the close association of attempted suicide with the convictions for drunkenness, and also the relation of alcohol to industrial inefficiency. In 1920 the total number of convictions for drunkenness was 96,000, and in 1919 it was 57,000. In 1921 the number was 77,000, a decline of 19,000 upon the previous year. The figures for deaths from cirrhosis of the liver did not fall in 1921 at the same rate as the figures for convictions. Roughly, when trade was good and employment brisk, convictions were more numerous than in bad times. In 1921 the figures for employment showed a marked downward tendency, and the days lost by strikes a great rise. The figures for convictions fell considerably below the figures for the previous year in the months during which the great strikes occurred, and also in the regions particularly affected by the strikes.

Professor F. E. WYNNE (Medical Officer of Health, Sheffield) said that what the Section was really discussing was the effect on efficiency of the abuse of alcohol. Many of them would agree that a certain amount of alcohol could be taken without any interference with efficiency, but beyond that amount alcohol immediately began to impair and finally to destroy the efficiency. Well-intentioned people were often so obsessed with the disastrous effects of excessive drinking that they ignored the social and other benefits which could be ascribed to the proper use of alcohol. To them alcohol was simply something to be abolished. The prohibitionist ignored the fact that by merely removing the temptation from the weak he was doing nothing to reinforce the infirm will. In the campaign against drunkenness the speaker had found one of the chief obstacles to be the teetotal propaganda which opposed any rational measures for the regulation of drinking habits. He still believed that the true solution would be found in the principle he put forward at the Annual Meeting of the Association in 1908—that the method of licensing should be logically applied to alcohol in the same way as to other commodities; it was not merely the vendor of alcohol, but the consumer who should be licensed.

Sir GEORGE TOULMIN (Preston) referred to the early days of temperance propaganda in Lancashire. To-day, unlike the position as it was years ago, alcohol was on the defensive. No one recommended it for hard labour or keen sport. It had been argued that if alcohol were as injurious as it was supposed to be, nature would have eliminated alcohol drinkers. But he presumed that alcohol was only a poison if it was "pushed" (in the medical sense), and alcohol was not always "pushed"; moreover, the ranks of alcohol drinkers were continually reinforced by those who had not hitherto taken alcohol. He believed that alcohol drinkers were being continually eliminated, but more facts needed to be ascertained on this side of the question. Fifty years ago the pot-boy used to go round the composing room in the printing office; now it was more likely to be the tea-girl, and that meant a real benefit, a higher level of efficiency, and a lengthening of productive life. The call for alcoholic refreshment had its origin in the call for intermission of strain, and if the hours of labour were so rearranged that that strain did not arise the habit would cease to a large extent. To the social reformer it was interesting to find that no one to-day advocated alcohol as a means of increasing productivity; the discussion centred around the measurement of its bad effect.

Mr. EBENEZER HOWARD, J.P. (founder, Garden City Association), described the progress of the garden city movement, and particularly the improved health and industrial efficiency at Letchworth, where he had never seen a woman the worse for liquor, and very rarely a man. Housing under garden city conditions would tend greatly to diminish intemperance. The speaker, like Professor Wynne, who had just spoken, was prevented from elaborating his argument by the PRESIDENT, who said that the purpose of the discussion was not to consider what steps should be taken to improve the sobriety of the nation, but to elicit facts, based on experiment or personal knowledge, as to the effect of alcohol on industrial efficiency.

Dr. A. K. CHALMERS (Medical Officer of Health, Glasgow) suggested that the human factor was rather being obscured in the discussion. At the time Lord D'Abernon made his inquiry, three or four years ago, in Glasgow broken time was a serious matter in the shipbuilding yards. On investigating as to the places of residence of the men who were irregular in attendance, it was found that the men who lived near the yards were as a rule steady, while the men whose homes were at a distance were unsteady. The men who lived near at hand were able to go home for meals; the men who came from a distance had to carry some sort of a meal in their pockets. Every doctor knew that when he gave alcohol to a patient the response was not in relation to the quantity he gave, but to the man's power to metabolize the whisky. One man was able to metabolize alcohol in his body better than another, and this had an important bearing on the problem. Men must not be regarded as entirely alike in this matter of alcohol effect.

ALCOHOL AS A BEVERAGE IN ITS RELATION TO INFANTILE MORTALITY.

BY

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INFANTILE mortality is a sensitive index of the well-being of a community. The higher it is the farther removed from healthful conditions is the life of the population in which it occurs; and in its fall everyone recognizes the record of the application of hygienic measures with success. It is when one comes to try to apportion the degree of blame among the various causes which are at work in raising or in maintaining the infantile mortality rate that one finds difficulty and invites difference of opinion. This is inevitable, because parental alcoholism, for instance, is only one among a number of medico-sociological conditions which influence adversely the lives of infants under a year. Bad housing is another; poverty is another; sexual immorality is a third; and so on. All these unite in raising the infantile mortality in any community; there is a reciprocal continuation and aggravation of one by another. To attempt to fix the part played by parental alcoholism as a cause of infantile mortality is really to try to evaluate an ill-defined segment of a vicious circle. At the same time it may not be worthless to survey the problem; even its mere statement may serve to clarify thinking on the matter.

It will be well, in the first place, to define the sphere of the inquiry. Infantile mortality means the deaths which happen in the first year of life, and it is conveniently expressed by the infantile death rate or the number of deaths in the first year per 1,000 live births. It is impossible, however, to exclude from one's thoughts the deaths which occur at or soon before birth, denominated rather unsuitably the stillbirths. It is true that they are foetal whilst the others are infantile deaths; it is true also that the mechanism by which they are brought about is different; but both these groups of disasters may be caused (directly or indirectly) by parental alcoholism, and one can hardly be considered without the other. Of course

one might go farther and include the early foetal or embryonic deaths which are the inevitable result of abortions; indeed, there is a sense in which sterility, in some at least of its forms, is really the expression of germinal deaths; but the emphasis in the present inquiry is to be laid upon infantile deaths and stillbirths. At the same time it ought not to be forgotten that parental alcoholism is a factor in the production of the earlier ante-natal deaths as well as in the disasters which take place at birth and in the first year of post-natal life, although the results of its action in the former are meanwhile statistically inaccessible.

In the second place, one is thinking in this inquiry not of the consumption of alcohol at long intervals and on rare occasions, but rather of its habitual use to a greater or less degree of excess. Alcohol is so diffusible a stimulant that its irregular and infrequent introduction into the body, whether of the mother or the infant (unborn or born) is followed by little or no change in the tissues (the direct effect); its occasional consumption has not the same dire effect upon the family finances as habitual "soaking" has, and it therefore does not lead to serious depreciation in the home environment (the indirect effect). The evil effects of alcohol upon infantile mortality and upon stillbirths are to be looked for in the case of the habitual woman drinker and in that of the man whose alcoholic habits lead to poverty.

Causal Factors in Infantile Mortality.

Into the causation of infantile death three groups of factors may enter. In the first place, infants at birth and in the first year of life come under the influence of all the lethal conditions which prevail in post-natal existence. The new-born child finds himself in an environment in which the impact of pathological germs is immediate; they may gain entrance to his body through the umbilicus or by the gastro-intestinal or pulmonary mucous membranes; and by the diseases they produce they may cause his death. Their action will be favoured by many other things, including, of course, improper feeding, exposure to cold, errors in the hygiene of the home, and the like. In the second place, infantile deaths may be due to injuries or infections received during the act of birth. Birth is truly a *janua mortis* to many an infant. In some cases the death is immediate and the child is dead-born; in others it follows later from cerebral haemorrhage and birth infections whose full lethal effect is not reached at once. In the third place, infants may come into the world dead, or die after birth from causes which have been active in ante-natal life. It is true that the foetus *in utero* is extraordinarily well protected against morbid agents, whether these reside outside or inside the body of the mother who carries him; but he is not invulnerable. If the placenta, the dominant organ of ante-natal existence, remains healthy, foetal life and health are not in danger; but if it becomes diseased or if morbid germs begin to pass through it, risks are at once introduced and ante-natal death may follow as the immediate result, or such a weakening of tissues may occur as to prepare the way for infantile death as the later result. It has now to be seen whether alcoholism in the parents acts in any or in all of the ways which have been sketched above—whether, in a word or two, it allies itself with the lethal factors which impinge upon the child in his post-natal, his intra-natal, or his ante-natal life. It will be convenient to begin with the last-named time—ante-natal life.

Effect of Alcohol in Ante-natal Life.

Ante-natal life commences far back in the ovum and sperm of the parents, and the agents which adversely affect it have been termed racial poisons. Is there reason to believe that alcohol acts as a racial poison? Experimental work on animals gives a clear reply that it does; from the nature of the case it is more difficult to draw conclusions as regards the human subject.

Professor Taav Laitinen[1] of Helsingfors has experimented upon the seeds of white peas and barley in order to determine whether watering them with alcohol solution had any effect upon germination. He found that even comparatively weak solutions of alcohol checked germination, especially in the case of peas, although they were surrounded with a rather strong protecting skin; and he regarded the term "germ poison" as justly applied to alcohol. An effect produced upon vegetable germination is, of course, a far remove from what alcohol may produce upon the human embryo; but it is of some importance that Laitinen, who before the war had experimented upon guinea-pigs, should have carried his researches back to the influence of this agent upon life as it exists in plants. The observation completes, as it were, the range of the investigation.

In 1917 the present writer[2] summarized the experimental work which had been done up to that date by Féré (on the hen's egg), by Stockard and Laitinen (on guinea-pigs), and by Pearl (on fowls). Féré had shown that alcohol injected into the hen's egg in incubation produced monstrosities and non-developments and that these were more numerous as the toxicity of the alcohol was increased. Stockard administered alcohol to guinea-pigs (males and females) for prolonged periods by inhalation; the offspring of the first and succeeding generations were weakly, malformed, and affected with a neurosis resembling paralysis agitans; and the conclusion seemed to be clear that fuming with alcohol permanently injured the germ plasm, that of the male cells being more affected than that of the female ones.

In a more recent contribution (to the International Congress against alcohol at Washington in 1920) Stockard[3] gave further results obtained from the study of the descendants of the alcoholized guinea-pigs, according to which the evil effects (abortions, stillbirths, malformations, and neuroses) were progressively less marked in the second, third, and fourth generations; in fact the fourth generation might be better than the original pair, and if crossed with the third generation might give "a very superior pig." The explanation was the destruction of those unable to withstand the effects of the alcohol. It is necessary to remember that these conclusions were drawn from male guinea-pigs.

The effect of Stockard's more recent work is useful, for it is most undesirable to draw exaggerated inferences either in one direction or the other in so vital a matter as the effect of alcohol on the progeny. The same lesson is to be learned from Raymond Pearl's researches upon fowls.[4] This observer gave ether, ethyl and methyl alcohol to the birds by inhalation for one hour daily. The results were a reduction in the proportion of fertile eggs with an increased power of hatching among the fertile ones, except in the cases where both parents were alcoholized: "treated" males with "treated" females gave 59.2 per cent. infertile eggs, whilst "untreated" males with "untreated" females gave only 23.2 per cent.; the differences in hatching power were slight. Courtenay C. Weeks,[4] who has carefully analysed Pearl's experiments, believes that they show that alcohol has a selective power upon certain germ cells and that it affects the germ plasm, although in the dosage used the power was not sufficient to produce hereditary modifications. In other words, the alcohol acted to some extent as a racial poison, the effect being always heightened when both parent birds were alcoholized. Incidentally Stockard's and Pearl's researches yield some slight support for Archdall Reid's theory of the progressive destruction of individuals little able to resist the effects of alcohol and the consequent establishment of an alcohol-resisting race.

When one passes from vegetables, birds, and guinea-pigs to the human subject in the germinal stage of existence it becomes, of course, difficult to obtain direct evidence of experimental status and impeccability. Bertholet,[5] more especially in his later observations, has shown marked morbid testicular changes in drinkers as compared with non-drinkers, and something of the same sort in the ovaries. Kyrle and Schoffer[6] have supported this conclusion by experiments upon dogs. It is true that tuberculosis has the same effect, and this fact introduces an element of error into some of Bertholet's results; but the relation between alcoholism and tuberculosis is a complex one, and neither Wlassak nor Neild thinks that the tuberculosis factor weakens the main conclusion—namely, that chronic alcoholism has a causal connexion with testicular degeneration.

It is difficult to demonstrate evil effects on the embryo from the use of alcohol by the mother, but so definite are the teratogenic effects of this substance in the case of eggs that it is probable that some teratological productions in the human subject have been due to this cause. In several cases the writer noted the coexistence of either maternal or

grandparental alcoholism in connexion with the birth of anencephalic foetuses. The bearing of such observations on the general question which is now under consideration is found in the fact that teratological developments lead directly to stillbirth, or, by interfering with nutrition, cause infantile death.

During the later months of foetal life it has been shown by Nicloux[7] that alcohol taken by the mother passes through to the infant, and others have confirmed this view. As a rule no recognizable evil effect follows unless the woman by previous drinking has damaged the placental tissue, and, of course, has possibly depreciated the ova in her ovaries. Whatever be the *modus operandi* the tendency to stillbirths, abortions, and premature labours is increased in the confirmed female inebriate who continues to drink in her pregnancies; this was clearly shown by Sullivan[8] a good many years ago. Bezzola[9] and Schweighofer[10] have demonstrated that the conceptions which occurred during times of carnival and vintage were apt to result in the birth of idiots or in actual dead-births. Wallace Wallin has pointed out that women inebriates with families showed an increasing number of stillbirths as they progressed from the first to later pregnancies; the number of stillbirths among the firstborn was 6.2 per cent. as against 17.2 per cent. for the later gestations.

Without multiplying references it is possible to reach the conclusion that in each of the three periods of ante-natal life—the germinal, the embryonic, and the foetal—the indulgence to excess in alcohol in either or in both parents is a danger to the new being. Sterility shuts it out from life altogether; abortion brings about a cessation of its vitality in early ante-natal existence; stillbirth is the signal that it has succumbed on the very threshold of its post-natal life, and when it does enter the door it passes in weakened and predisposed to infantile morbidity and mortality. As Dr. Boulenger[11] has put it: "l'alcool est un danger pour l'enfant depuis le stade de cellules germinatives jusqu'à sa naissance." Alcoholism, then, not only lessens the number of children coming into the world, but it damages those who survive birth so that they are more likely to succumb to other things in the first year of life. In some of the recent experimental work there is the hint that to some degree alcohol may have a selective effect upon ova and embryos and foetuses. It may be claimed that maternal alcoholism kills off the weaker ova, the so-called weeds; but if it does so, then does it not also weaken the strong ova, and so reduce them to the grade of the weaker ones, the weeds? It is dangerous to argue that alcohol by killing off the weak ova or embryos or foetuses is benefiting the race; if every killing off of the weak is accompanied by a weakening of the strong the race will not gain but lose. Such an argument is really sounding the note of retreat in the midst of the advance of hygiene; the "better dead" cry is an acknowledgement of defeat—it is the proclamation of pessimism.

Effect of Alcohol in Intra-natal Life.

In looking next at the infant or foetus in the intra-natal period—that is to say, in the act of being born—one must recognize that any effect of alcoholism then must be indirect. Birth is a more or less traumatic act. The full-time strong infant can pass through the birth canals without injury; but the infant who has had his tissues or those of his placenta weakened by parental alcoholism, especially if he be also born prematurely, will be far more likely to suffer from or succumb to the pressures and stresses of labour. In this way the number of stillbirths and of early post-natal deaths will be increased. If syphilis be superadded, as is not unfrequently the case, the integrity of the foetal organs, and especially of the vessels, will be seriously compromised. Such a foetus also may be, and no doubt is, more liable to infections during his passage from the uterus. It may be merely a coincidence that in New York in 1921 (the first year of prohibition) the stillbirths decreased by 19.7 per cent. as compared with the quinquennium 1913-17; but it is at least suggestive of a new hygienic factor coming into play. One must not, meanwhile, lay too much stress on it, for the coming of prohibition has synchronized in America with the culmination of a great attempt to reduce infantile mortality by all means.

Effect of Alcohol on Infantile Mortality.

When one comes to consider finally the effect of alcohol in the causation of death in the first year of life it is obvious that new factors are now at work. There will still be a continuance of the direct influence of parental alcoholism upon the tissues of the young infant, especially if the mother nurses her baby and continues to drink; but the indirect effects will now come to the front in the production of infantile mortality. The infant after birth is in a new environment: he is no longer protected by the placental filter from microbes and from some at least of the toxic or toxinic agencies which may be in his mother's blood, but is as open to their attack as anyone; he is subject now to the impact of physical agencies, such as heat and cold and injury; and errors in diet and defects in nursing all work their way with him—and how disastrous a way it may be everyone knows very well. In other words, the child is now at the mercy of the secret allies of alcoholism as well as being still the victim of that open enemy, the drinking habits of its parents, which has already weakened its tissues. Early post-natal life is made more rigorous for the infant by the action of these allies of alcohol. This becomes abundantly clear when one considers what they are.

In the first place, parental alcoholism interferes with the proper healthy housing of the young. When one or both parents spend money upon drink there is naturally less available for house rent, and so, sooner or later, the family passes into the one- or the two-roomed house. It is not under the circumstances there existing that an infant in arms runs the best chance of passing unscathed through the early months of life. Dr. Maxwell Williamson, the medical officer of health for Edinburgh, has said: "As may be expected, the influence of housing is reflected most rapidly upon the youngest and weakest members of the population." The four wards in Edinburgh which have the largest number of one- or two-roomed houses have the highest infantile mortality; and the ward, amongst these four, which has the fewest one-roomed houses has the lowest rate of the four. Further, the three worst wards have the public-house in prominence, possessing a very large proportionate number of licences to the population. Here, then, is seen alcohol in alliance with bad housing and overcrowding.

In the second place, drinking habits in the parents destroy health conditions in the home, whether it be a one-roomed, a two-roomed, or a many-roomed house. The National Society for the Prevention of Cruelty to Children has of recent years provided word pictures of the life in such houses which are hardly to be believed, so terrible are they. Sir John Kirk[12] has quoted one of these descriptions, and it is reproduced here in an abbreviated form:

> "The windows are broken and stuffed with rags; the walls are filthy; the beds, where there are any at all, are filthy and rotten; the odour of the rooms makes a visitor sick and faint. On the floor lies somebody drunk. On the table lies a beer-can; around it half-naked children stand perplexed, pale, hungry, and ill. . . . Their skin is alive with vermin. Their heads are sore with festerings. There is no food in the cupboard. The monotony of their existence is weekly broken by frenzies at midnight. . . . Baby is flung at the wall. Mother is felled with a chair. Sleeping youngsters are dragged from their bed, and, amid cursings and screams, the Sunday morning begins."

The young infant in such a "home" has a poor chance of surviving; every infantile malady has a better chance of proving fatal there; diarrhoea, bronchitis, the exanthemata, and whooping-cough all become more dangerous in such an environment.

In the third place, all accidents to child life are increased when drinking habits are found in the parents. There is, for instance, the overlaying of young infants, with its sinister frequency of occurrence on Saturday nights; Dr. Mary Scharlieb[13] attributes this week-end frequency to the receipt on Saturday of wages and to the remission of work on the Sunday—conditions which favour drinking in the parents. But overlaying is only one of the many accidents which are apt to happen to infants in the lessened safety of the drunkard's home; there is the risk of fire, and other casualties. An intoxicated mother is as safe a guardian for a young infant as an insane one.

In the fourth place, the venereal diseases often reinforce the destructive effects of alcoholism in child life. The dire

influence of syphilis on ante-natal existence is well known and shows itself strikingly in abortions and stillbirths; but it also extends its unhappy power to the first year of life, and by producing prematurely born infants who are congenitally weak it increases infantile mortality. Gonorrhoea whilst less death-dealing is apt to lead to congenital blindness. It is unnecessary to state that the venereal diseases are more commonly met with in alcoholics than in the general body of the population.

In the fifth place, the young infant is in danger from the evil effects of the disturbance of feeding which accompanies alcoholism. The daughters of alcoholics are often unable to suckle their babies, and so in the early weeks of life artificial feeding has to be resorted to. If the mother herself is given to intemperate habits the details of bottle-cleaning, etc., are carelessly performed or omitted altogether, with ill consequences to the infant. Even when the intemperate mother is able to nurse she is only too likely to do so with irregularity and carelessness. In one respect there has been in recent years a marked change in belief and habit: it is no longer regarded as necessary that the nursing mother should consume alcoholic beverages such as stout in order that there may be a plentiful supply of milk in her breasts, and the custom of taking such drinks in the puerperium and lactation time is in abeyance. It is now accepted that the best milk producer is milk itself or milky foods.

In the sixth place, illegitimacy is not infrequently found allied with intemperance, and it is now a commonplace of statistics that the mortality (after the first month) amongst illegitimate babies is far higher than that amongst those born in wedlock; this is true both of infantile mortality and also of the stillbirth rate.

Conclusion.

From all that has been brought forward the place of alcoholism in the vicious circle of causation of stillbirths and infantile deaths has been only too surely established. An alcoholic ancestry is no blessing, but quite the reverse, to the child *in utero* or after birth. Even when the ovum and the sperm escape infertility the embryo is apt to suffer from malformations, and the foetus is endangered when the placenta has been damaged; if the infant is spared the effect of the trauma of birth he comes into an environment in which the influences which I have called the allies of alcohol are at work, and bad housing, overcrowding, bad hygiene in the home, the risk of accidents, the dangers associated with illegitimacy, the disturbance of breast-feeding, and the impact of the venereal diseases, all combine with inherited weakness of tissue, and possibly also with prematurity of birth, to increase infantile mortality. It is no unimportant segment of the vicious circle which is due to alcoholism. As has already been said, the evaluation of this alcoholic part of the circle is impossible; but it may be safely believed that it is not inconsiderable, and that between it and the other segments of the round there is reciprocal continuation and aggravation.

Prohibition and Infantile Mortality.

The whole world is at the present time occupied in the watching of prohibition, the great medico-sociological experiment which is being carried out in the United States of America. From the point of view of alcohol in relation to infantile mortality it is, of course, an attempt to cut the vicious circle of causation. Some of the prohibitionist press already claim that great benefit has accrued. One must be exceedingly careful about drawing deductions. It has to be remembered that although the eighteenth amendment to the Constitution was ratified on January 29th, 1919, the law did not come into effect till a year later; that before the amendment there were individual States where the use of alcoholic liquors was prohibited; and that at the present time there are only about 3,500 inspectors acting for its enforcement. Miss Ellen C. Babbitt, the Research Editor of the American Child Hygiene Association, has pointed out these facts to me. One has, further, to remember that for the past few years a great crusade has been going on in America, just as in this country, for the saving of child life, and that considerable reductions in infantile mortality have been from time to time recorded. Thus, Mr. Louis I. Dublin, the statistician of the Metropolitan Life Insurance Company of New York, has drawn my attention to the fact that 1920 showed a very remarkable decline in the infant mortality rate; in the New York State figures for 1921 there is a further satisfactory fall; but to ascribe this continuance in the fall to prohibition is surely to invite sharp criticism. Yet that is what a prohibitionist paper is doing. To quote *The American Issue* (May 6th, 1922):

"Babies had a much better chance in dry 1921 than in the wet quinquennium (1913-1917). Deaths at birth decreased 7.8 per cent.; stillbirths, 19.7; deaths of children under five years, 31; under one year 23.5; . . . in deaths due to congenital debility and malformation 21.2 per cent."

The writer has no doubt in his own mind that prohibition, by lessening the allies (secret and open) of alcoholism, will cause a fall in infantile mortality; but he would be the last to claim that the statistics of New York, where by the way enforcement is believed to be specially defective, for the year 1921 represent the effect of the stoppage of alcoholic habits. One must never forget the fact of the vicious circle; just as many maleficent things combined to keep up a high infantile mortality, so many beneficent things, including the restriction of drinking habits, will work together in drawing it down. To claim a premature victory for prohibition on insufficient, on erroneous grounds would deal a blow to all real efforts to check infantile mortality along these lines. At the same time the writer has no hesitation in predicting that American prohibition will yet be seen to be one of the factors in lessening infantile mortality as well as stillbirths in the United States, and in all other countries which may follow in her wake.

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ALCOHOL AS A SELECTIVE AGENT IN THE IMPROVEMENT OF RACIAL STOCK.

BY

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IT gives me pleasure to have the opportunity of presenting to the British Medical Association some of the recent results of a long series of experiments on the influence of alcohol in development and inheritance. I am also glad to submit a simple scientific analysis of these results in order to dispel certain misinterpretations and exaggerations which have resulted from a popular exploitation of my findings by propagandists. The experiments were begun in 1909 in connexion with a series of studies on the modification of embryonic development. The author had no interest whatever in a sociological problem, and alcohol was used simply as an effective chemical substance easily administered to the material studied. A number of substances other than alcohol were used with similar results, but standard solutions of these were not so readily prepared and were not in all respects so favourably adapted to this work as were different strengths of alcohol.

By directly subjecting certain species of eggs which develop outside the body of the mother to a great number of chemical and physical treatments it was found that definite developmental modifications could be induced. The results were not specific for any given chemical substance but depended more directly

upon the developmental stage at which the embryos were subjected to the effective treatments. The developing eggs of marine fishes, in most instances those of *Fundulus heteroclitus*, a minnow of the eastern coast of the United States, were subjected to a graded series of alcohol solutions for various lengths of time during different developmental stages. By this simple experiment almost all known types of abnormalities were induced and the history of their development could be studied and analysed.

When eggs were placed in water containing from 1 to 5 per cent. of ethyl alcohol their rate of development was considerably inhibited and in the stronger solutions almost stopped. On later returning these eggs to the usual sea-water environment development was resumed at a normal or almost normal rate. Nevertheless, the arrests which had been experienced caused in many of the eggs the entire suppression of development, while in others the development of many organs and parts were greatly modified. The embryos developed abnormally and were monstrous in form.

An important fact to be noted is the great individual variation in the way the eggs react to the solutions. When any lot of one hundred eggs are examined after these treatments it will be found that a certain percentage of them are developing perfectly normally, as if these had entirely resisted the effects of the treatment; others are only slightly affected; others exhibit more marked modifications; and a number of the eggs have actually been killed. It is thus seen that the effect of the treatment varies with the hardiness of the egg. The poor eggs which would have, under usual conditions, developed into weak embryos are eliminated by the treatment, those of low average resistance are injured, while the particularly fine eggs are apparently not affected and live to hatch as vigorous young fish. This variable response occurs when eggs are treated with a sublethal dose of any chemical substance, and it is in no sense a peculiar reaction to alcohol.

Another fact that should be fully recognized in drawing general conclusions from the responses of these embryos to alcohol is that exactly the same injuries and developmental deformities are readily induced by the use of a great number of other chemical stuffs, and also by unusual physical conditions. The fact that such deformities are experimentally produced in embryos by the application of alcohol does not in any sense demonstrate that human deformities have been induced by a similar cause. The amount of alcohol in the solutions to which the eggs are subjected is greater than could be tolerated in the human blood stream. It is also a fact that common salt (sodium chloride), sugar, and many other constantly used substances in human food are equally as effective in inducing the same types of developmental modifications in these eggs as is the application of alcohol. The fact that an experimenter may use an effective dose of a certain substance to induce developmental disturbances has no direct bearing on the question of the use of this substance in very much smaller amounts by man or other animals.

These results should be considered in an impartial manner and should not be distorted for one purpose or another in a discussion of the use of alcohol by man. I can only say, as an embryologist, that the experiments give no certain proof that alcohol has ever caused abnormal development in the human embryo. Neither do they prove that it may not, except in so far as the doses here necessary to induce an effect are greater than we have reason to believe ever exist in the human body. One may ask, Why, then, were such experiments performed, and what is their value? The purpose was to analyse embryonic development by a study of the origin and differentiation of embryonic organs under modified and abnormal conditions.

The readiness with which structural formations may be modified in these externally developing eggs led me to attempt similar modifications in the internally developing embryos of mammals. With this end in view a series of experiments begun twelve years ago with guinea-pigs has been followed and expanded up to the present time. The records in this study now cover several thousand animals of pedigree stock, and probably no comparable experiments with mammals have been followed through so long a time with so large a number of individuals. The experimental method employed has been a daily inhalation of alcohol fumes up to a point of intoxication for the guinea-pigs. This method and the immediate effects of the treatment on individual guinea-pigs have been fully described in several publications. Dr. G. N. Papanicolaou has constantly been associated with the author in this work during the last eight years of the experiments.

The original purpose of simply affecting the embryo *in utero* soon became of secondary importance. Early in the work it not only seemed possible to affect the developing embryo by treatment of the pregnant mother, but it was also found that the spermatozoon of the male parent could be affected so as to modify the development of a normal egg with which it united in fertilization. The problem then assumed a broader aspect.

When the female mammal is treated with any injurious substance either before or during pregnancy the offspring may be injured in two different ways. In the first place, the strange chemical substance in the blood of the mother might pass directly through the placental membranes and act on the developing embryo, in much the same manner as do chemical solutions on the externally developing egg; or the foreign substance might disturb the metabolism of the mother to such an extent as to interfere with the proper supply of oxygen and food to the embryo. Under any condition this is an action on the developing embryo itself.

The second possibility in treating the female mammal is an injury of the ovarian eggs, the germ cells as such. This case, however, is difficult to differentiate from the first since the question always arises whether the effects of a treatment on the mother might not have persisted and acted upon the developing embryo *in utero*. Thus with the treated female it is difficult to attribute the abnormal development to an injury of the egg cells before fertilization rather than to an environmental influence acting on the embryo.

The treatment of the male, on the other hand, is a crucial test of injury or modification of the germ cells. On breeding treated males with normal females, abnormalities in the resulting offspring can only be attributed to the affected spermatozoa. With these general statements in mind we may proceed to a statistical presentation of the results of alcohol treatments on the progeny of the guinea-pigs.

I shall first present a demonstration of the fact that the treatments do actually produce effects on the offspring. In Table I records are given from normal animals paired alternately with normal and alcoholic mates. The first two columns show that when the same 35 normal male guinea-pigs were mated 81 times with normal mates and 81 times with alcoholic mates

TABLE I.—*Alternate Matings of Normal Animals with Normal and Alcoholic Mates.*

	Matings of 35 Normal Males Successively with		Matings of 44 Normal Females Successively with	
	Normal Females.	Treated Females.	Normal Males.	Treated Males.
Number of matings	81	81	77	81
Total offspring ...	196 2.42 Av. lit.	185 2.28 Av. lit.	195 2.53 Av. lit.	182 2.25 Av. lit.
Failure to conceive	6 7.90 %	6 7.90 %	3 3.89 %	10 12.34 %
Lived over 3 months	151 77.03 %	105 56.64 %	161 82.56 %	118 64.83 %
Died under 3 months	45 22.96 %	80 43.35 %	34 17.45 %	64 35.16 %
Defective	0	11 5.95 %	0	9 4.97 %

the records were widely divergent. The 196 young born from the normal combination showed a mortality during the first three months of only 22.96 per cent. and none of these offspring were defective. (The guinea-pig is mature at about 3 months old.) Of the 185 young produced by the same normal fathers mated with alcoholic mothers 56.6 per cent., or only a little more than half of them, lived to reach maturity. The mortality here was about twice as great as from the untreated mothers, being 43.3 per cent. as against 22.9 per cent. Eleven of these offspring, or almost 6 per cent., were structurally defective, while none from the normal combination showed any such defects.

The two columns on the right of Table I contain still more striking data, since these show conclusively that the male

germ cell or spermatozoon is definitely affected by the treatment. In this case 44 normal mothers were mated alternately with normal males and treated males. The same normal mothers produced all the offspring, but those recorded in the third column were sired by normal fathers, and those in the fourth column were sired by alcoholic males. The 77 normal matings produced 195 young, and there were only three failures to conceive. Eighty-one matings of the same females with alcoholic males gave only 182 young, and over 12 per cent. of these matings failed to result in conception. There was a mortality of only 17.4 per cent. among the offspring from the normal matings, while the alcoholic fathers sired offspring that suffered a mortality twice as high, being 35.1 per cent. Nine of the offspring from the alcoholic fathers were defective, but none from the normal sires.

This discrepancy between the records of offspring from the same normal individuals when paired with normal and alcoholic mates clearly demonstrates an injurious action of the experimental treatments on the germ cells of these mammals. We may further analyse very briefly in the following tables the action of these effects during later generations. In Table II are given the records of animals occurring in the different generations of the alcoholic stock. Section I contains data from the control or normal lines. These animals are of the same blood lines as the alcoholic stock—brothers and sisters and parents and offspring are in the two groups, and actually in cases the same individuals have first been used in the control and later in the experimental groups. There can be no doubt that any original defect or weakness that may have been in the stock from which the alcoholic animals were derived must also have been in the control stock, since the stocks are in all cases actually the same. All records in the present tables are of pedigree animals from thoroughly known blood lines and relationships. There is no inbreeding in either the control or alcoholic lines. It is as certain as experimental evidence can be that any differences between the records of the control and the treated groups must be attributed to the action of the alcohol treatment, since this is the only element of difference existing in the life histories or experiences of the two groups of guinea-pigs.

The records for the control show that the stock is strong and well. The average litter of young is about three, and the average litter weight is 188.85 grams at birth. The data from 506 control individuals show a total mortality before reaching maturity of only 22.72 per cent. One familiar with breeding guinea-pigs will recognize this as a very good record, far better than usual. In the last two columns of the table the total mortality has been divided into pre-natal and post-natal deaths. The absorbed embryos, premature births or absorptions, and stillborn young make up 53.91 per cent., or about half of the total mortality. The post-natal mortality, under three months of age, was 46 per cent. of the total. This equal division of pre-natal and early post-natal mortality is the normal expectation for these animals. But Section II of the table shows that in the alcoholic generations the pre-natal is double the post-natal mortality, and among the F_1 animals in Section III the pre-natal mortality is more than two and a half times greater than the post-natal.

Table II shows the size of litter in which the individuals occur. This is important, since animals born in large litters are at a disadvantage as compared with those born in small litters. The control section, for example, indicates that animals born in litters of two have a total mortality of only 17.5 per cent., while those born in litters of four suffer a mortality almost twice as high, or 33.3 per cent. The average litter size in the alcoholic groups is smaller than among the control. This fact actually benefits their records and the mortality readings are corrected for the differences in litter size in the total mortality line of the table.

Considering the successive generations it is seen that the offspring from directly treated parents present the poorest record of all. Almost 43 per cent. of their young are lost before maturity, and actually 70.3 per cent. of these are either absorbed as early embryos, aborted prematurely, or are stillborn. When these F_1 animals occur in small litters their chances for survival are greatly improved, so that of those occurring two in a litter only 28.5 per cent. died, but of those in litters of four 73 per cent. died. This fact conveys an idea of the great advantage possessed by members of the small litters. These are actually

TABLE II.—*The Records of Animals occurring in the Different Generations of the Alcoholic Stock.*

	Total Number and Litter Sizes.	Lived over 3 Months.		Total Mortality under 3 Months.		Absorbed, Premature, Stillborn.	Died within 3 Months after Birth.
		No.	%	No.	%		
I.							
Normal stock control:							
1	19	18	94.73	1	5.26	1	0
2	111	91	82.45	20	17.54	15	5
3	216	172	79.62	44	20.37	20	24
4	132	88	66.66	44	33.33	26	18
5	25	19	76.00	6	24.00	0	6
Average litter 2.72. Av. litter weight 188.85 g.							
Totals	506	391		115		62	53
Percentages (mean)			77.27		22.72	53.91	46.68
II.							
Alcoholic animals of all generations:							
1	58	45	77.62	13	22.37	9	4
2	316	241	76.26	75	23.73	51	24
3	579	364	62.86	215	37.13	137	78
4	204	78	38.23	126	61.76	83	43
5	40	11	27.50	29	72.50	22	7
Average litter 2.56. Av. litter weight 170.66 g.							
Totals	1197	739		458		302	156
Percentages (mean)			61.73		38.26	66.22	33.77
III.							
Alcoholic animals with treated parents (F_1):							
1	17	15	88.23	2	11.76	1	1
2	126	90	71.42	36	28.57	26	10
3	240	136	56.66	104	43.33	74	30
4	52	14	26.92	38	73.07	23	15
5	15	2	13.33	13	86.65	11	2
Average litter 2.56. Av. litter weight 165.89 g.							
Totals	450	257		193		135	58
Percentages (mean)			57.11		42.88	70.31	29.68
IV.							
Alcoholic animals with treated grandparents, great-grandparents, etc. ($F_{2\text{-}3\text{-}4}$):							
1	41	30	73.17	11	26.82	8	3
2	190	151	79.47	39	20.52	25	14
3	339	228	67.25	111	32.74	63	48
4	153	61	42.10	88	57.89	60	28
5	25	9	36.00	16	64.00	11	5
Average litter 2.56. Av. litter weight 173.73 g.							
Totals	747	482		265		167	98
Percentages (mean)			69.52		35.47	63.01	36.98
V.							
Alcoholic animals with treated great-grandparents and great-great-grandparents ($F_{3\text{-}4}$):							
1	19	16	84.21	3	15.78	2	1
2	70	56	80.00	14	20.00	9	5
3	120	88	73.33	32	26.65	16	16
4	68	32	47.05	36	52.94	21	15
5	10	7	70.00	3	30.00	2	1
Average litter 2.54. Av. litter weight 175.88 g.							
Totals	287	199		88		50	38
Percentages (mean)			69.33		30.66	56.81	43.19
VI.							
Alcoholic animals with treated great-great-grandparents (F_4):							
1	4	3	75.00	1	25.00	1	0
2	16	15	93.75	1	6.25	0	1
3	27	21	77.77	6	22.22	2	4
4	12	12	100.00	0		0	0
5	0	0		0		0	0
Average litter 2.46. Av. litter weight 183.43 g.							
Totals	59	51		8		3	5
Percentages (mean)			86.45		13.51	37.50	62.50

partial litters, the hardy survivors of an originally larger litter. When the records of the F_1 animals are corrected for litter size their mortality is about double that of the control.

Many of these F_1 animals are defective and many are sterile; thus only the best of them are available to give rise to the following generations. Yet in spite of this partial elimination of the defectives enough effect has been produced by the alcohol treatment on all individuals to cause the grandchildren to show an unfavourable record. When the records of the 747 animals of Section IV are compared with the control section the influence of the alcohol treatment is seen to be transmitted by the F_1

generation, although they had not been directly treated. The grandchildren of treated grandparents, the F_2 group, show a typical record closely comparable with that of the offspring from directly treated animals. The pre-natal mortality is here almost twice as high as the post-natal, and the total mortality is 64 per cent. greater than among the control.

Again, among the F_2 animals there are defective and sterile specimens. Thus another individual elimination and selection occurs in this generation and only the most vigorous individuals of the group are left to breed. These more vigorous specimens are in many cases mated with normal stock, so that the records of animals descended from treated great-grandparents are somewhat improved, yet the litter size is small and the mortality record for 287 such animals is 40 per cent. higher than among the control.

Finally, the constant elimination of the defective individuals through three generations and the matings with normal stock give animals descended from alcoholized great-great-grandparents which are superior in their records to the normal control animals. They are born in smaller litters than the control, but even when this is taken into account their mortality is actually only 64 per cent. of that of the control animals. Such animals actually have a total mortality before the age of maturity of only 13.5 per cent.

The fact that the F_1 animals from alcoholic ancestry are superior in record to the control is a point of actual significance. There can be no doubt that the offspring from treated parents are decidedly inferior as compared with the control; and further, that their offspring, or the progeny from treated grandparents, are also evidently inferior, but during these generations an individual selection is taking place through the elimination from the race of the defective and sterile specimens. This selection finally brings out a group of unusually strong specimens from which all the weaklings have been eliminated, and although they are not quite so productive as the control, their offspring show a record superior in vitality.

Should one desire to apply these experimental results to the human alcohol problem, it might be claimed that some such elimination of unfit individuals had benefited the races of Europe, since all of the dominant races have a definitely alcoholic history, and the excessive use of alcohol was decidedly more general three or four generations ago than it is to-day. That is, certain families that were alcoholic three generations ago have not been excessively so in the more recent generations.

Further evidence of significant importance regarding this selective action and the elimination of defective individuals is contained in Table III. This table was arranged to determine whether the alcoholic treatment of only male ancestors was as injurious to the offspring as the treatment of female ancestors.

The first three sections show the records of offspring from directly alcoholized parents. In Section I, when only the father was treated, the average litter was small, the total mortality was 71 per cent. higher than normal, and the pre-natal deaths were almost two and one-third times greater than the early post-natal mortality. The entire reaction is typical of the alcoholic line.

In Section II, where only the mothers were treated, the records are considerably worse than the records from the treated fathers. The average size of the litters was somewhat larger than from the treated males, but the actual litter weight of these larger litters was less. The individuals from alcoholic mothers were small at birth. The mortality among these offspring was 50.61 per cent., or almost two and a half times higher than among the control. For comparison, if we call the mortality of control animals 100, then the mortality of the offspring from treated fathers is 171, and from treated mothers 243.

Section III shows that the treatment of both parents does not greatly alter the results which would have followed if the mother alone had been treated. The total mortality is actually a little lower, but this is probably due to the small number of individuals recorded in this column.

The last three sections give the records of 747 descendants of the survivors from the first three sections. These records indicate the degree of transmission of the induced defective conditions. They supply the most striking data pertaining to the selective action which took place in the first filial generation of the alcoholic race to eliminate the defective individuals.

The records show the mortality to be highest among animals descended from treated males. And among such animals the pre-natal mortality is more than twice as great as the early post-natal mortality.

Animals having only female ancestors that had been subjected to alcohol treatment show in Section V a lower mortality than those from treated male ancestors. Here the pre-natal and post-natal mortalities are almost equal. At first sight it would seem as though the treatments had acted more severely on the male than on the female germ cells. None of the animals in the last three sections are the offspring of directly treated parents, so that all inferiority must be attributed to the action of the treatment on the ancestral germ cells. The superior record in the female treated section is, however, no doubt due to the more rigorous elimination of defectives that occurred among the F_1 animals in Section II.

The last section shows that the group of animals recorded as descended from both treated male and female ancestors have

TABLE III.—*Effects on the Progeny when only Male Ancestors were Treated, Female Ancestors Treated, or both Male and Female Ancestors Treated.*

	Total Number and Litter Sizes.	Lived over 3 Months.	Total Mortality under 3 Months.	Absorbed, Premature, Stillborn.	Died within 3 Months after Birth.
I.					
Only father treated:					
1 ...	9	9	0	0	0
2 ...	48	35	13	9	4
3 ...	87	61	26	20	6
4 ...	20	3	17	9	8
5 ...	5	2	3	3	0
Average litter 2.48.					
Av. litter weight 175.79 grams.					
Totals ...	169	110	59	41	18
Percentages ...		65.08	34.91	69.49	30.50
II.					
Only mother treated:					
1 ...	5	4	1	1	0
2 ...	38	26	12	9	3
3 ...	99	45	54	38	16
4 ...	20	5	15	11	4
5 ...	0	0	0	0	0
Average litter 2.61.					
Av. litter weight 162.82 grams.					
Totals ...	162	80	82	59	23
Percentages ...		49.38	50.61	71.95	28.04
III.					
Both parents treated:					
1 ...	2	2	0	0	0
2 ...	22	15	7	5	2
3 ...	45	24	21	15	6
4 ...	12	6	6	3	3
5 ...	5	0	5	3	2
Average litter 2.69.					
Av. litter weight 160.84 grams.					
Totals ...	86	47	39	26	13
Percentages ...		54.64	45.35	66.66	33.33
IV.					
Only male ancestors treated:					
1 ...	16	9	7	4	3
2 ...	66	56	10	8	2
3 ...	132	87	45	26	19
4 ...	61	17	47	37	10
5 ...	25	9	16	11	5
Average litter 2.66.					
Av. litter weight 175.63 grams.					
Totals ...	303	178	125	86	39
Percentages ...		58.74	41.25	68.80	31.20
V.					
Only female ancestors treated:					
1 ...	8	7	1	1	0
2 ...	62	47	15	6	9
3 ...	114	90	25	14	10
4 ...	44	19	25	14	11
5 ...	0	0	0	0	0
Average litter 2.59.					
Av. litter weight 178.73 grams.					
Totals ...	228	163	65	35	30
Percentages ...		71.48	28.37	53.84	46.15
VI.					
Male and female ancestors treated:					
1 ...	17	14	3	3	0
2 ...	62	48	14	11	3
3 ...	93	51	42	23	19
4 ...	44	28	16	9	7
5 ...	0	0	0	0	0
Average litter 2.40.					
Av. litter weight 166.84 grams.					
Totals ...	216	141	75	46	29
Percentages ...		65.27	34.72	61.33	38.66

also a bad record as compared with the control data shown in Table II. The results in this section are at first sight somewhat misleading, since they are better than those from only male ancestors treated and are worse than those from only female ancestors treated. But here again the elimination which took place in the first generation has ensured to some extent the quality of the survivors, and makes it improper to compare the total results as an actual measure of the original effect induced.

We may briefly compare the data in the two sets of sections to demonstrate the consequence of the severe elimination of unfit individuals which is taking place in these experiments. In the first three sections the size of litter was smallest from treated fathers, larger from treated mothers, and largest when both parents were treated. In the last three sections the litter size is exactly reversed; it is largest for those with male ancestors treated, smaller when female ancestors were treated, and smallest among animals with male and female ancestors treated. The mortality records show about the same relationship. Among the offspring of directly treated parents the mortality was lowest from treated fathers—171 against 100 as normal; the mortality was very high from treated mothers—243 against the normal 100; and high when both parents were treated—213. The descendants from the treated males which had suffered the lowest mortality in the first generation subsequently show the highest mortality in later generations—188 against 132 for descendants of treated females, and 165 for the descendants from both treated males and females. This simply means that when the action of the treatment is severe on the first generation, as was the case when the mothers were treated and the highest mortality among offspring obtained, only the comparatively hardy individuals survive. Their descendants later show a superior record in comparison with the descendants from treated males among which the eliminations in the first generation had not been so severe. Taking the mortality records of the first three sections and writing under them the records from the same lines in the last three sections we find that when the mortality is high in the first generation it is low for subsequent generations, and vice versa:

171	..	243	..	213
188	..	132	..	165
359	..	375	..	378

If the two numbers in the three sets of mortalities be added together the sum in each case is about the same.

When we consider the welfare of the race or stock rather than that of the individual it is found that the descendants of those groups of animals which suffered the highest mortalities and withstood the most rigorous selection are superior in quality to the descendants from the groups less severely affected. This individual selection furnishes a great advantage to the later generations, as is shown by the superior quality of the F_4 group of guinea-pigs in the Table II.

DISCUSSION.

Professor LOUISE MCILROY, M.D., D.Sc. (University of London), said that it was extremely difficult to dogmatize on this subject of alcohol, for the reason that it was so bound up with other questions, such as problems of illegitimacy and venereal disease, all of which meant a bad environment for the child after it was born. It was extremely difficult and dangerous to say that a particular condition was due to alcohol, and another condition was due to venereal disease, because they were all so much bound up together. But she wished to impress upon the Section the enormous importance of knowing what the condition of the mother was before the child was born. She had not the slightest hesitation in saying that if she were given the responsibility of looking after the children of the country, she would rather surrender the responsibility of looking after the children after they were born than give up her control of the conditions for the nine months previous to their birth. More pre-natal care would mean greatly lessened mortality after birth. She had been greatly disappointed to hear one speaker in the Section of Obstetrics say that it was extremely difficult to get ante-natal clinics formed in Glasgow. Ante-natal clinics offered one of the solutions of the alcohol problem. Alcoholism in the mother during pregnancy must have an enormous effect on the child. How could a mother soaked in alcohol be expected to bear a healthy child? The child came into the world with what was known in the insurance companies as a "bad life." This affected the State in two ways. In the first place alcohol prevented conception. Alcoholic women were very frequently sterile. If conception occurred, it was difficult to carry on the foetus to full term. During pregnancy abortion, which was a terrible wastage of child life, was very liable to take place. The placenta was poisoned, and, naturally, the child was poisoned also. Until there was some means of dealing with abortions, like their notification and registration, it would never be known how great a wastage of child life they represented. This was a most important question for the State. If the population was to be kept up sterility must be prevented by protecting the health of the potential mothers and of the potential fathers also. The effect of alcohol on the sperm or male cell must be guessed at to a certain extent. It was possible that alcoholic parents had devitalized children. She would not dogmatize on that point, but she did know that maternity cases in which the women were habitual drunkards gave those in charge of them enormous anxiety. In alcoholic cases, where the muscles were poisoned with the toxaemia, those in attendance were compelled to have resort to all kinds of obstetrical operation, and with every operation the chance of the child's life was diminished, and of its health if it survived the ordeal of birth. If the necessity of operative interference in births was to be diminished, those interested in the question of alcohol must get the State and the local authorities to establish and encourage ante-natal clinics. To her own mind foetal welfare and foetal mortality were far more important subjects than infant welfare and infant mortality. Ordinarily the giving of an anaesthetic such as chloroform or ether in a case of labour was fairly safe, but in the alcoholic subject it was dangerous, because the whole of the organs were clogged with the alcoholic poison. From the sterility among alcoholic women, and from the frequency of abortions and the difficulty of childbirth, one could see nature to a certain extent putting forward her efforts to reduce the number of children entering the world from alcoholic stock. Here some of them were faced with a moral problem which affected their conscience. Were they themselves to take any part in reducing the number of these children born into the world? This raised the whole question of the segregation of the people who were unfit for parentage, and how, if at all, they were to be prevented from propagating. The present-day teaching was that every individual should have liberty in this matter. But were men and women who were chronic alcoholics to be allowed to propagate children for the State to look after? A great deal of propaganda was going on at the present moment, which from the medical point of view, apart from the moral point of view, was extremely dangerous, calling for an artificial diminution of the birth rate, and she believed that this propaganda might produce very serious effects during the next few years if the public were not warned in time. But the production of devitalized children by alcoholic parents was just one of the things that would furnish that propaganda with its arguments.

Mr. THEODORE NEILD (Leominster) criticized certain points in, or omissions from, Dr. Stockard's paper, particularly the absence of any statement as to the direct effect produced upon the animal. He had had the great privilege, however, of meeting Dr. Stockard at Cornell University, and was shown by him some of his animals, which did not appear after vaporization to show the least sign of physical deterioration. He had had the opportunity of speaking with another investigator on this subject, Bertholet of Lausanne, who told him that in the case of animals which had been vaporized the children of an alcoholized father had a certain progeny, the children of an alcoholized mother a rather larger progeny, and the children of an alcoholized father and mother a slightly higher progeny still. This did not quite agree with the statement that children of alcoholized parents were less fecund.

Dr. R. B. MCVITTIE (Dublin) said that infant mortality was very largely the result of ante-natal conditions, and it was difficult to form any correct estimate of the effect of alcohol, because the parents' statements had to be accepted, and alcohol did not make for truthfulness. Therefore statistics were likely to be even more misleading in these cases than they were under more favourable circumstances. His opinion was that alcoholics gave birth to a greater number of children than a corresponding number of temperate people, but that the death rate amongst those children

was much higher. But the whole subject seemed to be summed up in one word—metabolism. This most elaborate and complicated process was influenced in the human subject by such an extraordinary combination of social, psychological, emotional, and hygienic circumstances that it was very difficult indeed to allot the correct value to any individual factor. Some experiments on plants which the speaker had carried out seemed to be of some interest in this connexion. He grew six plants under exactly the same circumstances: two tobacco plants, two geraniums, and two veronicas. He watered one specimen of each group with a measure of water, and the other with the same measure of water together with a teaspoonful of whisky. At the end of a week the "whisky plants" looked decidedly greener and more healthy than the "teetotalers." He then increased the whisky to two teaspoonfuls to the dose, and at the end of the second week the "whisky plants" were still the more flourishing and slightly the taller. Then came a sudden frost, and within about four hours the "whisky plants" were withered, and next morning were dead, while the others which had had no whisky were quite well and lived for many months. Demonstrations on the influence of alcohol on the metabolic rate would be helpful in clearing away some of the clouds of opinion, which were often the result of the personal factor rather than of evidence which scientific observers could accumulate.

Closing Remarks by the President.

The PRESIDENT OF THE SECTION (Dr. Fothergill), at the end of the four discussions, said that it was not easy to sum up from the chair without tending to reiteration. The members of the Section had listened, much to their advantage, to scientists, scholars, and social workers, all of whom were well equipped and competent to speak upon the subject selected. As far as possible the discussion had been limited to defining to what extent, if any, the use of alcohol as a beverage affected physical and mental health, industrial efficiency, and infantile mortality—all of them important social problems, although they by no means exhausted the list. As was to be expected, the voice of the advanced school—the progressive school—had been heard. What would become of any social problem if such a school ceased to exist? The rest of them were debtors to the enthusiasm of that school. There seemed to be two classes into which social reformers interested in this question could be divided: There were those who concentrated on the individual and those who concentrated on the surroundings of the individual—that is to say, there were those who were interested in the environment of the individual character and those who were interested in the environment of circumstances. The medical profession of necessity tended to join itself with the latter class, and it would be from that aspect that its co-operation would be obtained. Given active, intelligent, preventive social work, which led to the improvement in the environment of circumstances, one might reasonably hope that the environment of the individual character would at last have its chance. Just as it was the case with individuals, so with groups, classes, and also with nations—no two were exactly alike. To each there had been given a unique personality, and this was essential in order to fulfil its unique part in the social adventure. The privilege, therefore, of a group or class, specially educated to express an opinion, carried with it great responsibilities. It should be recognized that there was lying at this moment ready to the hand of each such group or class something to be done with regard to the use of alcohol as a beverage, which something could not be done by any other group or class, and if it were not done a fully satisfactory solution of the problem would be prevented. Was it, therefore, too much to appeal, whilst the Association met in Glasgow, to employers and employees, to all groups in the Church, to the other learned professions, and, in fact, to all who were striving to perfect our empire, that they should busy themselves with that aspect of the question with which they were specially qualified to deal? Could they not all come together, there and then, to try and discover what preventive work they could combine to do? And, having decided on it, could they not take steps to secure informed and organized public opinion in its favour?

In conclusion, on behalf of the British Medical Association, he thanked the readers of papers as well as those who by their contributions to the discussion had helped toward what might well be considered a most successful double session. Especially he wished to thank the two honorary secretaries (Dr. Alex. Forbes and Dr. David McKail) for many months of strenuous, anxious, and unselfish work. (Applause.)

Before the meeting concluded the Rev. C. C. WEEKS proposed and Dr. J. W. BALLANTYNE seconded:

> That the Council of the British Medical Association be requested to assist in the promotion of further inquiry into the effect of alcohol taken as a beverage on the individual and the community.

This was carried unanimously.

The Sections.

BRIEF SUMMARY OF PROCEEDINGS.

(*Continued from page 218.*)

SECTION OF MEDICINE.

Thursday, July 27th.

THE Chairman, Dr. Hawthorne, in the course of a few introductory remarks, said that the subject for discussion—exophthalmic goitre—was one of great importance, not only to the physician, but also to the surgeon, ophthalmic surgeon, laryngologist, endocrinologist, and general practitioner. Professor G. R. MURRAY then read his paper on exophthalmic goitre. He began by urging the importance of a more full consideration of the prevention of the disease. In dealing briefly with the general pathology of the condition he discussed the possible cause of exophthalmos. The three main views as to its causation which had been put forward were those of (1) vascular engorgement, which, in his opinion, had little to support it; (2) increase of orbital fat; (3) over-action on the part of Müller's muscle. This last view was not, in Professor Murray's opinion, a probable one, since the fibres of this muscle were very feeble, the muscle too far from the globe to produce proptosis, and, furthermore, if it did, it should, from its anatomical position, do so in an upward and forward direction. He inclined to the second view—namely, that an increase of orbital fat was the most likely cause of the proptosis. He next dealt with some of the etiological factors. In a series of 300 cases he had found that the disease occurred more frequently in women—to the extent of three to one, but it was interesting to note, he said, that former statistics had shown a proportion of eleven to one, indicating, therefore, that sex was not as important a factor as was hitherto thought. He pointed out that a family history was sometimes obtained, and instanced a number of cases to support this. Nervous strain and shock were certainly factors, but the condition seldom resulted from physical injuries. He then went on to discuss the relationship of simple goitre to exophthalmic goitre, and urged the importance of treating many of the simple cases along the same lines as would be adopted in Graves's disease. He emphasized the importance of recognizing the symptoms of exophthalmic goitre in its early stages, as treatment, if adopted then, was much more likely to be of value than if the case was one of some duration. As regards treatment, Professor Murray said that almost complete rest was essential at the commencement. It was his practice as regards diet to allow no red meat or extracts, but he was in the habit of giving milk and fats in usual amounts. In discussing the value of x rays in the treatment of exophthalmic goitre, Dr. Murray emphasized the importance of discontinuing this method of treatment if no improvement had attended it after six months' trial. Radium he had found useful in many cases, but there was danger in acute cases. Surgical treatment was indicated if medical treatment had failed, if the thyroid gland was much enlarged, or if time was an important factor to the patient; but the risk of operation could not be forgotten.

Dr. C. M. Wilson (London) asked why it was that more progress was not made in the subject of exophthalmic goitre. He himself thought it was because all discussions centred round late cases, whereas attention should be riveted on the early recognition of the disease. He urged the importance of basic metabolic measurements in the early diagnosis of the condition, and showed several cases on the screen which illustrated the diagnostic value of the basic metabolic rate in relation to exophthalmic goitre. Mr. James Berry said that co-operation between physician and surgeon was of extreme importance in the successful treatment of Graves's disease. He admitted the danger in operative measures, and emphasized the importance of having the patient under personal observation for at least a few days before the operation was performed. He admitted the undoubted

benefit from rest and *x* rays in many cases, but warned his hearers against carrying on *x* rays too long. The longer the duration of the disease, the more unlikely was it to be successfully treated at the hands of the surgeon. In acute cases surgery should be avoided during the most acute stage unless there was definite evidence that no myocardial degeneration was present. During remissions of the disease operation gave the best results. Ether in small quantities was, in his opinion, the best anaesthetic; local anaesthesia was disappointing, and chloroform dangerous. Dr. Riddell (Glasgow) said that about 80 per cent. of patients suffering from exophthalmic goitre got relief from *x*-ray treatment. In some cases the thyroid gland might not show much decrease in size, but the amelioration of symptoms suggested that the *x* rays had been of benefit. He was in favour of giving fairly long applications at considerable intervals rather than minute doses frequently. He agreed that no good was got from continuing treatment for more than six months. Dr. Purves (South Africa) urged the importance of vaccine treatment in cases of exophthalmic goitre.

Professor David Drummond called attention to the frequency with which the condition of hyperlymphism was present in cases of exophthalmic goitre, and showed specimens from a recent *post-mortem* examination—the patient having died suddenly after operation—in which the lingual tonsil was much enlarged and the thymus gland nearly five times its normal size. This state, amounting to status lymphaticus, would often, he thought, prove to be the cause of sudden death after operation, and an attempt should be made to diagnose it. Mr. Mamourian (Ashton-under-Lyne) said that the longer *x*-ray treatment was practised the more difficult was the operation for the surgeon. He thought it important that the question of dosage should be in the hands of the physician or surgeon and not in those of the radiologist. Local anaesthesia was, in his opinion, the anaesthetic of choice. Dr. H. C. Tidy asked when exophthalmic goitre could be considered cured. He instanced cases where exophthalmos persisted and the thyroid glands still remained large, but the symptoms otherwise had apparently disappeared. Dr. Tidy also read a communication from Lieut.-Colonel McCarrison dealing with the present trend of research regarding the origin of exophthalmic goitre. Dr. Hawthorne said that the Section was fortunate in having had first-hand information on the subject of exophthalmic goitre, and welcomed the fact that so much emphasis had been placed on the subject of prevention of this disease. Professor Murray then replied and made clear certain points which had been raised by the speakers.

Friday, July 28th.

After a few introductory remarks by Sir Archibald Garrod, who was in the chair, Sir Humphry Rolleston opened the discussion on degenerative diseases of the liver. He began by dividing liver degenerations into two main groups: acute or subacute; and chronic. The main points raised by Sir Humphry Rolleston in his paper were: (1) Tests for functional efficiency of the liver: their scope, limitations, and results, especially in slight and latent degenerations of the liver. (2) The question whether the jaundice occasionally seen in early syphilis, in syphilitic patients after arsenobenzol treatment, and the jaundice of munition workers depended on inherent weakness of the liver, or were due to an additional factor—namely, infection. (3) The explanation of the delayed onset of symptoms in persons previously exposed to the action of poisons, such as trinitrotoluene in arsenobenzol preparations. (4) Whether changes in degenerative diseases of the liver were due to failure of the damaged cells to remove from the blood the bilirubin formed elsewhere, or whether the liver cells, as the result of disordered function, shunted the bile pigment into the lymph and blood capillaries instead of into the biliary capillaries. (5) If the anaemia in a hepatic degeneration was due to failure of the liver cells to resynthesize urobilin and iron into haemoglobin. (6) Intrahepatic formation of urobilin. (7) How far the incidence of cirrhosis after hepatitis accompanied by degeneration of the liver cells was obviated by concomitant hyperplasia of the liver cells. (8) Whether the interstitial hypoplasia in cirrhosis was initially a beneficial process. (9) The value of haemosiderinuria in the diagnosis of haemochromatosis. (10) The relation of primary carcinoma of the liver to a previous degeneration and de-differentiation of the liver cells.

Professor Maclean, who spoke next, confined himself chiefly to the tests employed for determining liver efficiency. Such tests differed very materially from those of the kidney because the functions of the liver were not yet fully understood. We did know, however, that the liver played the chief part in carbohydrate metabolism. The laevulose test was based upon that, and he found it useful as indicating deranged function of liver. The lipase test also was probably useful, but he himself had not had much experience of it. Dr. C. M. Wilson said that the real need was for a test which would give information indicative of liver damage before symptoms were evident. He thought that the laevulose test and the haemoclasic test were valuable, though positive results were got in conditions other than those of liver damage. Dr. Spence confined his remarks to a description of the laevulose test, and showed a series of cases on the screen illustrating results obtained with this test in cases of moderate, severe, and extreme liver insufficiency. The ultimate scope of this test was yet to be determined, but even now it undoubtedly served a useful purpose. Dr. McNee stated that a fuller knowledge of the structure of the liver was essential, for as yet it was far from being understood. He doubted very much whether all liver cells were the same. Great advances had been made in the knowledge of one type of cell—namely, the star cells of Kupffer, which lined the vascular capillaries. He demonstrated on the screen slides which showed these cells to be very numerous in the outer third of the lobules; they increased in number after poison had been introduced. He maintained that bile pigment was formed chiefly in Kupffer cells and in the endothelial cells of the spleen in man. The extent of jaundice in no way indicated the amount of damage to liver cells.

Professor Muir discussed the three chief factors in the production of jaundice—namely, obstruction to the bile ducts, blood destruction, and damaged hepatic cells. More knowledge was wanted on the part played by the hepatic cells in the production of jaundice. With regard to cirrhosis of the liver, Professor Muir did not agree with Sir Humphry Rolleston that the new formation of connective tissue was purposeful. In haemochromatosis he agreed that fibrosis was the first stage and pigmentation followed. Sir William Willcox spoke on the toxicological aspects of liver degeneration. He reminded his hearers of the great protective function of the liver against exogenous poisons. He held that the delayed onset of jaundice seen in patients previously treated with arsenobenzol preparations was not due to arsenic, but to the effects of that compound upon the liver itself. Professor Stewart described a series of cases of toxic jaundice which, with two exceptions, completely recovered after certain periods of time; this seemed to indicate that all the cases must have had at one time atrophy of the liver resulting in a fibrosis which was, however, not progressive. He suggested that haemochromatosis might possibly be due, in some cases at least, to congenital defect. Dr. Stuart McDonald spoke of the part played by bacterial infection in the production of acute yellow atrophy. Sir Archibald Garrod, in summing up, said that the subject had divided itself into two main parts—namely: (1) Functional tests on the liver, and (2) formation of bilirubin and the jaundice that occurred in the liver cells. Sir Humphry Rolleston replied very briefly to points raised in the discussion.

SECTION OF MICROBIOLOGY, INCLUDING BACTERIOLOGY.

Thursday, July 27th.

THE bacteriology of influenza was the subject discussed on July 27th. Sir William Leishman occupied the chair on the suggestion of the President, Dr. Buchanan. Dr. Mervyn Gordon first discussed the bacteriology of catarrh, and pointed out that no examination could be regarded as complete until films from its fresh material had been examined by Gram's stain and Giemsa, cultures made on agar enriched with ascites fluid, blood, etc., and when practicable a specimen of the secretion filtered through a Berkefeld filter and the filtrate cultured in Noguchi's medium. He discussed the general properties of filter-passing organisms less than 0.5 of a micron in size, drawing attention to the difficulty of staining them and securing cultures. Dealing first of all with acute coryza, Dr. Gordon recalled that Kruse in 1914 demonstrated the presence of a filter-passing virus in the common cold, and that Colonel Foster confirmed this work and grew an organism in Noguchi's medium from the filtrate of nasal secretions. Passing on to discuss influenza, Dr. Gordon considered that the many negative results obtained by experimental inoculation with Pfeiffer's bacillus and the frequent finding of this organism in other conditions constituted

strong reasons against regarding it as the primary infective agent. On the other hand, Yamanouchi and Olitsky and Gates showed that inoculation of a filtrate of the nasal secretion caused influenza and the virus could be cultured. Dr. Gordon's own observations concerned a sharp outbreak of influenza among the nursing staff of St. Bartholomew's Hospital when fifty-seven nurses were attacked. The diluted nasal secretion was passed through a Berkefeld filter and cultured in Noguchi tubes. In positive cases a cloudiness appeared round the tissue at the bottom after four to six days, and films from this cloud stained with Giemsa showed minute round specks. From 20 cases so examined a filter-passing organism was recovered in 14. Dr. Gordon drew attention to the great difficulty of staining and culturing this virus, but showed several lantern slides of microscopic preparations illustrating clearly the appearance of the organism.

Professor J. McIntosh referred to some work carried out in the winter of 1918-19 when Pfeiffer's bacillus was recovered from 80 per cent. of the patients examined, and found *post mortem* in 75 per cent. of patients dying from influenza. He failed to isolate any filtrable virus from recent cases examined, but produced typical influenza lesions by inoculating cultures of Pfeiffer's bacillus; he therefore still regarded Pfeiffer's bacillus as the primary infective agent. He criticized conclusions drawn from the appearance of "cloudiness" in cultures, since such cloudiness often appeared spontaneously; even if a filter-passing organism could be isolated from influenza cases, there was still no proof that it caused the disease. Dr. J. H. Dible recorded his study of the fermentation reactions of forty-six strains of influenza bacilli, which he found could be separated into several different groups. He obtained the characteristic blood picture of influenza by injecting bacterial toxin, and criticized the work of those who looked upon influenza as caused by a filtrable virus.

Sir William Leishman referred to evidence derived from preventive inoculation with *B. influenzae* vaccine. The results obtained were different in different parts of the world. In two reports presented the vaccine had conferred no benefit, but in a third instance marked protection seemed to have been derived from the vaccination. Professor Ledingham favoured Dr. Gordon's point of view, and criticized Professor McIntosh's results. Dr. Twort referred to the desirability of stating the exact conditions under which filtration was carried out. It was not necessary to use blood for the cultivation of the influenza bacillus, since it would grow well on ordinary nutrient agar in symbiosis with certain soil bacteria. Dr. Fleming remarked on the diversity of agents which might be responsible for initiating a common cold, and Colonel Mackie described the severe epidemic in India, when six million people lost their lives.

Dr Buchanan recorded an experiment in which a plate was exposed in front of the mouth of an influenza patient, with the result that Pfeiffer's bacillus and pneumococci and streptococci all grew in culture. The case for the filter-passer was strong, but it was necessary to keep an open mind.

In his reply Dr. Gordon agreed that it was proved conclusively that experimental inoculation of Pfeiffer's bacillus could produce lesions identical *post mortem* with those found in influenza, but were there not other facts behind this? He did not claim that the filter passer was necessarily the cause of influenza, but that it was present, and he appealed for it to be looked for and carefully studied. His filtrations were carried out under a *minus* pressure of 10 to 12 cm. of mercury, the operation lasting only about five minutes. Undoubtedly a filter-passing organism was present: what its significance was we were not yet in a position to say. Sir William Leishman, in concluding the discussion, said that an organized attack on the problem from many different angles was about to be undertaken by the Medical Research Council.

Dr. Andrew Connal read a paper on the development of *Loa loa* in Chrysops, in which he described the development of the filaria from the time of its ingestion by the fly to full maturity. He recounted the technique adopted for catching and feeding the flies and the three phases of development of the filaria and its manner of escape from the proboscis of Chrysops. Sir William Leishman congratulated Dr. and Mrs. Connal on this brilliant research.

Friday, July 28th.

In opening the Microbiology Section on Friday Dr. Buchanan pointed to the importance of close co-operation between those studying plant and animal bacteriology. Professor H. V. Blackman opened the discussion on similarities and dissimilarities between plant and animal diseases by showing a series of slides illustrating the manner in which *Botrytis cinerea* and the rust fungi attack plants. The former of these secretes an enzyme which destroys the tissues in advance, the hypha of the fungus entering directly through the cuticle; the hyphae of the rust fungi, on the other hand, enter through the stomata, and the cells of the plant are not killed but stimulated to fresh activity by the symbiotic relationship which is established. No general body reaction to infection can be demonstrated in plants in response to infection such as that which occurs in the animal body under similar conditions. He referred also to the virus diseases of plants, and pointed out that some of these were known to be carried by insects. On the whole he considered that the dissimilarities were greater than the similarities when plant and animal diseases were considered, chiefly on account of the absence of a general body reaction in plants. Dr. W. B. Brierley discussed the general relationship between plant parasite and host, and declared that in plant pathology the more vigorous host often took disease more readily than the weaker, and the fungus under such circumstances was stimulated to greater activity. The final condition established was usually one of symbiosis. There was, he said, little in common between animal and plant pathology. Professor F. H. Gaiger was of the opinion that the dissimilarities were greater than the similarities when plant and animal diseases were compared. He pointed out how little was known as to how virus diseases were communicated from one plant to another. Dr. Ledingham said that man was particularly resistant to fungus diseases, and Professor Blackman had chiefly considered these. In the field of natural immunity there seemed to be a great deal of common ground, and bacterial invasion of plants had many similarities to human bacterial invasion. Professor Ellis pointed out that plant and animal protoplasm was essentially the same, and if lower forms were compared in each group many similarities must be found. Dr. Buchanan also thought that the similarities were greater than the dissimilarities, and expressed the opinion that a society for the study of comparative pathology and microbiology of plants and animals would serve a very useful purpose. In his reply, Professor Blackman agreed that fundamentally there must be marked resemblances, and that these would appear more numerous as knowledge advanced.

Dr. Brierley read a paper on the mutation of species, in which he appealed for a careful use of the term "mutation," explaining the limited sense in which this term was used in other branches of science. While not denying the possibility of mutation in micro organisms, he considered that no adequate proof of such mutation had yet been adduced, or could be in the present state of our technique and knowledge. Professor Ellis referred to certain remarkable changes in size, shape, fermentation reactions, etc., he had observed in bacteria in prolonged cultivation, but did not claim that these evidenced mutation in the narrower sense defined by Dr. Brierley. Dr. Twort pointed out how unreliable was information derived entirely from morphology, and referred to the difficulty of being certain of "genetic purity." In his reply Dr. Brierley described the manner in which genetic purity could be assured, and declared that there was no biological reason why true mutation should take place. At the adjourned meeting of the Section in the afternoon Professor Ellis read a paper on the intimate structure of the bacterial cell, and described the manner of formation and germination of spores and discussed the presence of nuclei in bacteria. He claimed to have converted non-motile cocci into motile organisms possessing flagellae by frequent subcultivation. A vote of thanks to Dr. Buchanan, President of the Section, was moved by Sir William Leishman and carried with acclamation.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

Thursday, July 27th.

THE President, in opening the Section, proposed a resolution of congratulation to the Dean of the Faculty in Paris on the occasion of the centenary of the presentation of the thesis by Bayle in which for the first time the view was expressed that the symptoms of paralysis complicating insanity were those of a distinct disease now known as general paralysis of the insane. The resolution was seconded by Sir Frederick Mott and carried unanimously.

Sir James Purves Stewart, in opening the discussion on the treatment of neuro-syphilis, said that neuro-syphilis comprised only those nervous or mental symptoms which were

actually due to the syphilitic virus or its toxin. The present-day classification should be into meningo-vascular syphilis and parenchymatous or degenerative neuro-syphilis and combinations of these. The former included gummata and syphilitic arteritis, and the second those toxic degenerations such as tabes and paralytic dementia. In treatment the physician had to decide on the drug and the channel of its administration. Present-day methods aimed at a combination of salvarsan and mercury. Gummatous lesions responded best to such treatment; in syphilitic arterial lesions the amount of recovery depended on whether thrombosis had occurred, for no amount of treatment would restore an infarcted area. Parenchymatous neuro-syphilis was singularly resistant to treatment, and arrest of the degenerative process was all that could be hoped for. Various supplementary methods of treatment, such as the production of fever, had been employed in association with salvarsan in cases of parenchymatous neuro-syphilis. Query's monkey serum and Dercum's spinal drainage method were referred to. The technique of intrathecal treatment was described and reference made to the various substances employed, and tables showing results of cases treated by intrathecal administration of the patient's salvarsanized serum or of mercurialized horse serum were exhibited. The method was not advisable in paralytic dementia, but in tabes and cerebro-spinal syphilis the results were very encouraging. Some of the clinical results by intracisternal injections in cerebro-spinal syphilis had been striking; it appeared to be the most satisfactory method of dealing with early cases of paralytic dementia. The direct intraspinal administration of arsenical preparations should be discarded.

Dr. Kinnier Wilson (London), in "Observations on the treatment of neuro-syphilis," spoke from the point of view of a clinician. The whole story of the spirochaeta was not known; often there was no sharp line of demarcation between meningo-vascular and parenchymatous neuro-syphilis. Tabes was not purely a parenchymatous degeneration, for there was an active granulomatous infiltration around the posterior nerve roots. Many cases tended to spontaneous arrest and made the result of treatment very difficult to gauge. Of the three methods of treatment—(1) Mercury by the mouth and arsenic intravenously; (2) mercury, and salvarsanized serum intrathecally; (3) mercury, and mercurialized serum intrathecally—the latter on the whole was to be preferred. Successes and failures in tabes were described; slight symptoms and signs at the onset were no guarantee of success in treatment. Treatment had not been greatly improved by the introduction of the arsenical preparation. In some cases the Wassermann reaction could not be influenced by treatment; the aim should be to render the reaction negative, but it was not always possible to do so. Dr. G. K. Adams (Glasgow) discussed the treatment of neuro-syphilis with special reference to changes in the cerebro-spinal fluid. He thought that arsenic given intravenously probably reached the infected focus, though perhaps not in sufficient concentration to be of use; no trypanocidal power was found in the cerebro-spinal fluid afterwards. The symptoms of onset were often overlooked or misinterpreted; if the disease could be recognized in the stage of symptoms before signs developed, much might be hoped for from treatment. Dr. Ernest M. Dunlop (Glasgow) dealt with the bearing of the Wassermann reaction on the diagnosis and the control of treatment in nervous syphilis. He detailed the result of examination of the blood and cerebro-spinal fluid in neuro-syphilis; of the cerebro spinal fluid in miscellaneous conditions; and of the cerebro-spinal fluid in treated cases of syphilis. In eight cases of tabes out of 107 a positive reaction would have been missed but for the examination of the cerebro-spinal fluid. Dr. Aldren Turner (London) summarized the results of mass treatment of 200 cases of neuro-syphilis from the National Hospital, Queen Square. He divided the cases into: (1) Tabes of long standing with marked signs but a negative Wassermann reaction in blood and cerebro-spinal fluid; this group comprised 10 per cent. of cases. (2) General paralysis and tabes with a positive Wassermann reaction in both blood and cerebro-spinal fluid; 75 per cent. of cases. In this group no material improvement was observed as the result of treatment, and some cases progressed in spite of it. All had intravenous injections of N.A.B. and mercury injections. No intrathecal injections were given. (3) Tabes of short duration in young persons with Wassermann reaction positive in blood and cerebro-spinal fluid, 12 per cent. These improved clinically and serologically. Treatment must be begun within a few months of the onset. It must be continued for a sufficient time, and it must be repeated at intervals.

Dr. Stanley Barnes remarked that the results of the salvarsan treatment were a little better, but not much better, than those obtained in the old days with mercury alone; in 10 per cent. of all cases the disease tended to die out whether treated or not. The aim should be to find some drug which would percolate more easily. He suggested protein shock in addition to mercury and arsenic injections, in the hope of aiding the percolation of these drugs into the cerebro-spinal fluid.

Sir Frederick Mott doubted if there was much evidence that the arsenical treatment was much better than mercury inunction, and therefore prophylactic treatment—the prevention of the entrance of the organism—was of the greatest importance. In 66 per cent. of fatal cases of general paralysis of the insane organisms could be found in the substance of the brain and in the perivascular spaces; they were found especially easily in four cases treated by intrathecal injection. Mercurial treatment was extremely valuable and inunction the best way of giving it. He referred to the simple and effective Sicard method which gave small doses on alternate days of N.A.B. hypodermically or intramuscularly in glucose. Professor Browning (Glasgow) considered that no satisfactory experimental evidence had yet been offered of the existence of a neurotropic variety of spirochaete. The problem of therapy in nervous disease was very difficult; all cases attending a venereal clinic should be examined as to their nervous system to determine at what stage neuro-syphilis arises. Dr. David Lees (Edinburgh) spoke from an experience of 3,000 to 4,000 cases of early syphilis in which he had tried all methods of treatment previously mentioned except that by intracranial injection. He was not satisfied that any better results were obtained by spinal drainage than by the Sicard method, but in eight of nine cases of tabes in which Query's monkey serum was used intramuscularly very definite improvement followed. Dr. H. J. McBride (London) dealt with the changes in Lange's colloidal gold reaction as a result of treatment, and detailed the routine treatment of neuro-syphilis as employed at the National Hospital, Queen Square. Early optic atrophy should be treated with mercury and iodide.

Friday, July 28th.

In the absence of the President, Professor G. M. Robertson, the chair was occupied by Sir James Purves Stewart. Dr. J. H. Macdonald, in his paper on the element of contrast in the psychic mechanism, said that amongst associative bonds in ideation that due to contrast was very powerful, and had not received the consideration it deserved. From the dawn of consciousness till the end of life man was ever experiencing a contention of elements for and against the expansion and existence of the individual. The importance of contrast was tacitly recognized in the training and upbringing of the child, which to a large extent was based upon the principle of impressing definite ideas of thought and conduct. The capacity to criticize, largely founded upon play of contrasting images, varied greatly in different individuals. Forced inhibitions attendant upon ordinary educational schemes tended to discourage the critical capacity. Notions and doctrines laid down by teachers and parents were apt to be accepted without criticism. Those who wished to encourage the spread of anti-social and revolutionary ideas were fully alive to this fact and sought to impress them upon the child in his early years. The paper was discussed by Dr. Gordon (Bath) and Dr. Helen Boyle (Brighton). Dr. Donald Core was prevented by illness from reading his paper. In his communication on epilepsy and gunshot wounds of the head, Dr. Aldren Turner said that out of 18,000 cases of gunshot wounds of the head under the Ministry of Pensions, 800, or less than 5 per cent., had developed epilepsy. This was seen in two forms: (1) Following slight trauma without obvious injury to the skull or brain; (2) true traumatic epilepsy following injury to the skull or brain and associated usually with paralytic symptoms. In (1) it was often difficult to say how far the fit might be attributable to the head injury; its importance was due to the number of ex-service men who had received a minor gunshot wound of the head and now stated that they had in consequence become epileptic. Jacksonian epilepsy was rare in comparison with the incidence of ordinary traumatic epilepsy. Traumatic epilepsy following wounds of the brain was attributable in part to the injury, but in greater part to the constitutional disposition of the patient; the local conditions at the seat of injury only in part explained the phenomena.

In the discussion which followed, Dr. Kinnier Wilson said it was very significant that no less than 95 per cent. of head wounds escaped epilepsy; trauma was a grossly overrated factor in the causation of nervous disease. The mechanism of production of a fit was associated with transient vascular changes in the brain; blanching of the cortical surface had been observed to precede a fit. The neuropathic inheritance was of great importance; in many instances similar or dissimilar heredity could be traced. Dr. Wilson related a very striking case of psychogenic epilepsy. Dr. Gordon (Bath) said that all cases of epilepsy in ex-service men in the south-west district of England came into his view. Epilepsy in gunshot wounds did not depend entirely on instability of the nervous system. In dealing with the intelligent and better-class patient much good followed the re-establishment by training of general control. A direct family history of epilepsy was seldom obtained, but 75 per cent. of the epileptics had a neuropathic family history. Dr. Mary Barclay (Edinburgh) held that the fact that of individuals with a wound of the head 95 per cent. did not develop epilepsy was not of much importance apart from knowing what part of the brain was struck and how. Dr. Humphrey (Glasgow) referred to two cases of psychopathic epilepsy. Dr. Macdonald (Govan) inquired as to the relation between traumatic and idiopathic epilepsy; did the mental condition of the patient change in the former as in the latter?

Sir James Purves Stewart suggested that the time had now come to get rid of the term "idiopathic" as applied to epilepsy; its realm was gradually shrinking, and it should be banished. Dr. Aldren Turner, in reply, thought that the term "idiopathic" should not yet be abandoned; there was still a small group of epileptics which could not be satisfactorily classified. The experience of surgeons was eagerly awaited in these cases. Bone-grafting operations might be artistically perfect though therapeutically they left a great deal to be desired. An epileptic should not be considered cured till he had been free from fits for five years.

SECTION OF OBSTETRICS AND GYNAECOLOGY.

Thursday, July 27th.

THE proceedings of this Section were opened by a paper by Dr. W. Osborne Greenwood of Harrogate on anaesthetics and analgesics in labour. He pointed out that shock and exhaustion aggravated by pain and fear were the almost necessary accompaniments of every labour. Recent work had shown the profound effect of these factors upon the cells of the master tissues of the brain, liver, and suprarenals. Chloroform and ether given for a prolonged period not only did not give protection from shock, but actually intensified the very condition they were seeking to alleviate; they were actually prone to initiate and continue those cell changes of acidosis, and even disintegration which they were seeking to avert. With scopolamine and morphine they were able to secure that most important consideration, brain rest, while at the same time permitting the essential labour organs to perform their functions perfectly. By those means an ideal labour and a shockless operation could be attained. He then proceeded to enumerate the details of his technique, laying particular emphasis on the testing of the degree of amnesia obtained, and indicating what he regarded as the most important danger signs—analgesia, restlessness, and rapid pulse. These signs were the result of a faulty technique. He laid stress on the importance of regulating the dosage according to the individual patient. With a proper technique he had not met with any bad effects on either mother or child in a long series of cases. In the absence of Dr. Hirschman a paper by him on the standardized dosage method of using scopolamine-morphine during labour was read by Dr. H. G. Taylor, one of the honorary secretaries of the Section. He was followed by Dr. Martin of Bradford, who from the point of view of the general practitioner explained why he had given up employing the scopolamine-morphine method in favour of a method of his own wherein he employed the continuous administration of small doses of chloroform by means of Junker's apparatus, combined with the repeated injection of small doses of infundibulin. In the discussion which followed, the President and Drs. Lapthorn Smith, Chalmers, Ruxton, Blair, Russell Andrews, Lackie, Prell, Miller, Thomas, Hendry, and Eden took part. Dr. Greenwood, in a brief reply, said that the question of the employment of twilight sleep should not be regarded simply as one of supply and demand by the patient; he thought the method should be encouraged by the profession in the interests of the patient.

Dr. T. W. Eden (London) then read a paper on the treatment of eclampsia. He thought the time was now opportune for attempting to secure uniformity in this most important subject, in which up to the present the most chaotic views had existed, not only among the general bulk of the profession, but even among teachers themselves, with the result that the most divergent methods of treatment had been employed even in the hospitals. After a brief historical survey of the different modes of treatment given in times past, he quoted the figures which had been recently presented to the British Congress of Obstetrics and Gynaecology at Liverpool. In 1,800 cases treated in hospital in England, Scotland, and Wales there was a mortality of 24 per cent.; in 200 cases treated in hospital in Ireland the mortality was 10 per cent. He laid down a series of propositions: (1) That eclampsia was easier to prevent than to cure; prophylaxis was therefore imperative. (2) Prompt removal to hospital immediately after the first fit should be recognized as absolutely necessary. (3) That a proper classification of cases must be made in order to arrive at the correct indications for treatment. (4) That the minimum degree of obstetrical interference only should ever be carried out—that is, induction if labour were not spontaneous, and low forceps if circumstances demanded this. (5) That the simplest medical methods gave the best results—namely, water only by mouth, and lavage of the stomach and colon, to be repeated if necessary. The paper was discussed by the President, Dr. Campbell, Dr. Douglas, Professor McIlroy, Dr. Lapthorn Smith, Dr. Lawrie, Dr. Russell Andrews, Dr. Ballantyne, Dr. Prell, Professor Munro Kerr, Dr. Farquhar Murray, and Dr. Lewis.

Friday, July 28th.

The proceedings were opened by a paper read by Dr. Robert Knox (London) on the treatment of gynaecological conditions by *x* rays and radium. In dealing with the general question of radiation treatment he said that it would simplify the matter if it were assumed that the potency of the radiation employed was the important point, and that it made very little difference whether the radiation was produced by an *x*-ray apparatus or a quantity of radium. The essential thing was to be sure that the area treated should get a dose of sufficient intensity to produce the changes necessary for the cure or relief of the condition. The technique of the application and the estimation of dosage were therefore of the utmost importance. Dr. Knox then proceeded to explain the methods employed for arriving at a correct estimation of the dose and the method of application. He stated that the newer methods, particularly that known as the Erlangen method, involved a considerable strain on the patient. He then summarized the contraindications, advantages and disadvantages, and the dangers of *x*-ray or radium treatment. His own experience had been such that, though some remarkable results had been obtained by radiation, in all cases which were suitable for surgery he strongly recommended it. In the case of fibroids, removal of the tumour was not nearly so rapid by radiation as by operation, while the drain on the system, while not so sudden, might be as severe. He treated these cases in close collaboration with the gynaecologist. An animated discussion then took place, in which the President, Mr. Cecil Rowntree (London), Professor Johnstone (Belfast), Professor Munro Kerr (Glasgow), Dr. Burrows (Manchester), Dr. Farquhar Murray (Newcastle), Professor McIlroy (London), Dr. Chapman (Glasgow), Dr. Gamlen (Newcastle), and Dr. Lochrane (Derby) took part. Dr. Knox, in his reply, dealt with many questions which had been put to him.

A paper was then read by Dr. John Campbell (Belfast) on the treatment of salpingo-oöphoritis. At the outset he claimed that no distinction should be drawn between acute salpingitis and acute appendicitis; both might burst and set up general peritonitis. In acute cases, therefore, he urged the necessity of early abdominal operation in preference to expectant treatment. In regard to chronic cases he classified them under two headings: (1) When sterility was the main symptom he thought that expectant treatment should be tried, and referred to the possible advantages of curettage and massage. (2) When pain was the main symptom then he advised that expectant treatment should give place to abdominal operation. As regards drainage after operation on these cases, he confessed that he felt safer in all acute and many chronic cases when he had packed the pelvis with gauze partly ensheathed in thin rubber. He was trying hard to persuade himself to discard drainage; there was much to be said for the method of filling the abdomen with

saline and completely closing the parietal wound, but he still thought that in certain cases drainage was absolutely necessary. He advised that a preliminary colostomy should be done on all cases when it was known that an abscess had been discharging into the rectum before the pelvic operation was undertaken. He regarded the use of vaccines as of secondary importance. Dr. Campbell's paper provoked a vigorous discussion, in which the President, Dr. Nigel Stark (Glasgow), Dr. Farquhar Murray (Newcastle), Dr. Cameron (Glasgow), Professor McIlroy (London), Professor Munro Kerr (Glasgow), and Professor Johnstone (Belfast) took part. Dr. Archibald Leitch (London) then made a short communication on vaginal involvement in cancer of the cervix.

In closing the proceedings of the Section, the President remarked that the importance of their discussions and the size of their audiences had fully proved the claim of their Section to sit on three days. A vote of thanks to Professor Ewen Maclean for the able manner in which he had discharged the duties of President was proposed by Professor Johnstone and carried with acclamation.

SECTION OF PATHOLOGY.

Thursday, July 27th.

A DISCUSSION on animal and vegetable pathology in relation to human disease was held on July 27th, with Professor J. H. Teacher in the chair. Professor F. G. Hobday (London) opened the discussion by insisting on the need of close co-operation of pathologists, medical and veterinary, in a united attack on disease common to man and the lower animals. He dwelt particularly on the communicable diseases. Glanders would soon be entirely eliminated from animals in this country, and consequently it could not again be communicable to the human subject. The stamping out of rabies showed what could be done by a collaboration of the two professions. Anthrax, for the occurrence of which amongst animals the importation of animal products was mainly responsible, was largely controlled by the precautions taken by the Ministry of Agriculture, and human cases might be even more satisfactorily diminished. Tuberculosis of milk cattle, responsible for so much of the tuberculosis of children, was unfortunately too rife, and Professor Hobday pleaded for a conjoint effort to get rid of this terrible scourge. Foot-and-mouth disease, cowpox, mange, and ringworm were other instances of animal diseases communicable to man. Professor W. H. Lang, F.R.S. (Manchester), said that it was difficult to make comparisons between diseases in plants and in animals, because the former possessed no anatomical systems comparable to the latter. The connexion, too, between plants and animals was so very remote: they had diverged and were separate as far back as geological evidence went. He demonstrated beautiful sections of ancient plants found in the Old Red Sandstone of Scotland, showing the proliferation of cells around the stomata caused by volcanic gases. The greater part of the paper dealt with the question of plant tumours, and Dr. Lang gave a very able criticism of the view that these crown-gall tumours were similar to animal cancers. The so-called "secondaries," which had been compared to metastases, were not in reality separated from the primary growth: it was only that the increase in length of the stem had separated what formerly had been adjacent tissues.

Sir Clifford Allbutt recalled that at the annual meeting in 1882, and again in his lecture to the Association at its last Glasgow meeting in 1838, he had pointed out the great advantage of the comparative method. No great advance in any department was possible without this method. If it had not been for animal experimentations pathology would have been non-existent. Arguing by analogy had been the bane of science and medicine. Disease was not an entity: it was a deviation of processes, an abnormal series, and not something from without. He thought that the absence of anatomical systems in plants comparable to those of animals was no drawback in the study of comparative pathology: it simplified the analysis of fundamental processes. Professor Gaiger (Glasgow Veterinary College) said that the more they studied animal and human diseases the more they agreed in ultimate detail. A study, too, of diseases peculiar to animals often shed considerable light on similar diseases in man. The difficulty of getting pure anaerobic cultures that delayed antiserum investigations during the war might possibly have been done away with by a study of some anaerobic conditions of the sheep. Mr. W. B. Brierley (Rothamsted), speaking from the botanist's point of view, held that more help would come from a mutual study of pathogenic agents rather than from investigations of their effects. Analogies between plant and animal diseases must be treated with careful circumspection. But much could be done by workers on both sides in improving technique, in classification of bacteria, in studies on virus diseases, in investigating the rates of dispersal of infective organisms.

Sir William Macewen (President of the British Medical Association) said that he had started that morning to make a tour of the Sections, but as the papers of the Pathological Section had proved so interesting he had remained there the whole time. He emphasized the importance of a combined medical and veterinary campaign against tuberculosis. Dr. Elliot and Mr. Orr briefly dealt with rickets in pigs, and maintained that it was due to deficiency of calcium in the diet, and not to lack of any vitamin. Mr. Gofton, speaking of tuberculosis in animals, stated that 43 per cent. of cattle were affected, but only in a much smaller percentage was the disease communicable. In about 7 per cent. of cows the tuberculosis was generalized. Only 1 in 147 cows had tuberculosis of the udder, and adding to that the number of cases that showed infection of the supramammary lymph glands, there were altogether about 1 per cent. of dangerous cattle. It was an observed fact that cows might excrete tubercle bacilli in their milk without clinical signs of tuberculosis or involvement of the udder.

Friday, July 28th.

Dr. Archibald Leitch occupied the chair on July 28th. Professor Stuart McDonald and Dr. A. F. Bernard Shaw (Newcastle) gave particulars of a unique case of persistent eosinophilia with splenomegaly. The blood condition before and after splenectomy was recorded, together with histological studies of the spleen and lymphatic glands. The authors were inclined to regard the disease as a leukaemia of eosinophiles. Professor J. Shaw Dunn (Birmingham) contributed an important paper on primary chronic interstitial nephritis and arterio-sclerotic kidney. Whilst arterio-sclerosis might cause shrinkage of the renal cortex, it did not produce a condition which resembled true chronic nephritis macroscopically or microscopically. Primary chronic interstitial nephritis or renal cirrhosis was quite distinct from even extreme arterio-sclerotic atrophy, and showed a greater degree of derangement of renal architecture. It was more difficult, however, to differentiate it from secondarily contracted kidney. Dr. E. H. Eastwood (Sheffield), from an examination of appendices removed by operation or obtained in the *post-mortem* room, found oxyuris as commonly present in the one case as in the other. With regard to the number of eosinophiles present in the wall, which might be taken as a sign of the pathogenic properties of the worm, these were quite independent of the presence of oxyuris, though they bore a definite relation to the duration of the appendicitis. Drs. Bennett, Blacklock, and Browning (Glasgow) gave a convincing account of the value of flavine in severe burn wounds. At no time did a pellicle form over the granulation tissue, as had been asserted, nor was the formation of granulation tissue in any way inhibited. Dr. W. MacAdam (Leeds) read a paper on the decrease of cholesterol of the blood in anaemia. Dr. D. F. Cappell (Glasgow), who had injected certain dyes into the animal body, found that the substances were actively taken up by the wandering connective tissue cells, by the endothelium of lymph sinuses, and the vascular endothelium of certain organs (liver, spleen, and bone marrow), whereas vascular endothelium elsewhere did not attract the dye. Professor M. J. Stewart (Leeds) stated that the healing of gastric and duodenal ulcers was a common event. He suggested that acute and chronic ulcers had an equally good chance of healing. The relation of carcinoma to gastric ulcer, the sequelae of ulcers, and the method of healing were carefully considered.

SECTION OF PUBLIC HEALTH.

Thursday, July 27th.

THE first half of the second day's proceedings was occupied by a discussion on the defects of infancy and childhood. Dr. Bruce (S.M.O. Glasgow) described in detail the extent and nature of the defects in local children at the age when they enter school, and several interesting comparisons with other areas were instituted by speakers who followed. Dr. Mary J. Menzies, of the Scottish Board of Health, followed with a description of the different welfare schemes in operation throughout Scotland, which called forth a criticism of the ultimate results of excessive zeal in this direction. The question of industrial fatigue and methods of inquiry were

next dealt with by Dr. McKail (Lecturer on Public Health, St. Mungo's College, Glasgow), followed by a rather technical paper, read by Dr. Paton (Assistant M.O.H. Glasgow) for Dr. J. P. Kinloch (Lecturer on Public Health, Aberdeen), on the constituents of fresh and vitiated air. The paper which gave rise to the liveliest discussion was that of Dr. Wynne (Professor of Public Health, University of Sheffield), who with much causticity, fortunately not unflavoured with wit, criticized the aims and methods of the present-day public health service. Near the close of the session time was found for the reading of an abstract of a somewhat lengthy paper by Dr. Khalil (London School of Tropical Medicine) on sewage disposal in the tropics, with special reference to helminth infections.

Friday, July 28th.

The last day's proceedings opened with a paper by ex-Bailie W. B. Smith (a member of Lord Newton's Committee on Smoke Abatement), which asked the question, "Should we longer tolerate this pollution of the air?" By means of diagrams, maps, and photographs Mr. Smith furnished convincing evidence of the deleterious effect on health of a smoke-laden atmosphere, particularly by the formation of fog, and showed how the prevailing winds cleared certain towns, but smothered others, according to geographical position. Professor Leonard Hill and Dr. T. M. Legge, of the Home Office, entered into the discussion from two opposite standpoints, which left little room for Mr. Smith to reply. The next paper, by Professor Hope (Liverpool), on the training for the diploma in public health, was read in his absence by one of the secretaries (Dr. J. J. Paterson, M.O.H. Maidenhead), and gave rise to considerable discussion as to whether practice or theory should be accorded the premier place in the preliminary training of a medical officer of health. The second half of this session was devoted to a joint discussion with the Tuberculosis Section upon the administrative requirements of the various types of tuberculosis. Dr. Macgregor (Assistant M.O.H. Glasgow) opened with a paper describing the various methods of treatment applied to a group of some seven hundred ex-service men notified in Glasgow as suffering from tuberculosis in one form or other. A number of medical superintendents from well-known sanatoriums took part in the discussion, from which it appeared that, as the President (Dr. A. K. Chalmers, M.O.H. Glasgow) expressed it in summing up, a fork in the path of treatment had been reached. The proceedings then closed with the customary compliments to those who had taken part.

SECTION OF SURGERY.

Thursday, July 27th.

THE programme arranged for the second day's meeting of the Surgical Section, while of great and valued interest both to surgeons and practitioners, did not attract quite such large audiences as were present on the other days. But the scientific value of the session was none the less great. Sir Kennedy Dalziel, one of the vice-presidents, presided. The first subject discussed was the non-traumatic affections of the spleen, and was dealt with in the first instance by a physician—Dr. James Carslaw (Glasgow); then by a pathologist—Dr. E. H. Kettle (London); and the surgical technique was described by the Chairman. Dr. Carslaw, in referring to the lack of knowledge of the function of the spleen, pointed out that one function at least was known—namely, blood destruction, and the cases which seemed to call for splenectomy were those in which these blood-destroying processes were centred entirely, or almost so, in the spleen. Splenomegaly was a feature of many infections, and removal of the spleen was not called for simply because of its enlargement. There were two groups of cases where the disease, probably a toxic agent, seemed to be centred in the spleen: splenic anaemia and acholuric jaundice. Possibly there were other kinds of splenic anaemia, one example of which was Banti's disease. He referred in detail to some of the cases in which splenectomy had been successful. Some of those did not come under the two main categories mentioned. One was a spleen which, after removal, seemed to be tuberculous; whether primary or not he could not say. Another one was pernicious anaemia, though in that disease as a rule splenectomy was not recommended unless there were very definite enlargement of the spleen. There had been only one fatal case in the series and it was difficult to classify it, but he was disposed to place it amongst splenic anaemias, and although the patient's death took place a year afterwards he included it within the statistics. The greatest success for splenectomy was in acholuric jaundice, though it had to be kept in mind that many cases of this disease did not require operation.

Dr. Kettle discussed very fully the known physiology and pathology of the spleen. It was a scavenging organ for removal of destroyed or decrepit red cells from the circulation and for liberating haemoglobin and passing it through the liver. Probably the spleen had an important function in combating infective processes by inducing phagocytosis. Some organisms found a resting place in the spleen, and in infections immune substances were found in greater quantity in the organ. Its function had also to do with the digestive system and it was linked up with the ductless glands. Little more was known of the pathology of the spleen than of its physiology. It would seem that increased resistance of the red cells—that is, diminished fragility of the red cells brought about by splenectomy—tended to the disappearance of the disease most suitable for the operation—namely, acholuric jaundice. The position, however, was anomalous, because in many of the cases the fragility of the red cells actually persisted after splenectomy, although the patient was apparently cured. Banti's disease presented a difficult problem because it was divided into three stages by that author; the first of these stages might last twelve years, and he doubted if it were a clinical entity at all. Spleens in Banti's disease examined by him presented very little change; at all events the changes were not commensurate with the clinical manifestations. Before they stereotyped their treatment by splenectomy they should know more about the pathology, though operative treatment was often perfectly justified. The malarial spleen might be removed more often than it was because of the danger of rupture, and because it was a definite focus of infection. The operation was not in many instances an extraordinarily difficult or dangerous one. In children sudden death took place after splenectomy, but at a much later date, when the child had apparently been restored to perfect health; the cause of the sudden death was unknown.

In speaking of the technique of the operation Sir Kennedy Dalziel did not regard the operation as essentially dangerous. The only trouble likely to be met with was haemorrhage. He operated through the incision placed in the middle line supplemented with a transverse incision. He thought that the pedicle should be double-clamped and the spleen removed by cutting between the clamps, so that no blood was allowed to escape from the spleen itself, and the spleen having been removed the vessels caught in the pedicle could be dealt with seriatim. The post-operative leucocytosis found was not greater than that following other major operations. He had had no deaths after removing the spleen.

Mr. A. J. Walton (London) read a paper, illustrated with lantern slides, on the surgery of the pituitary gland. He discussed the anatomy, especially the relation of the arteries in the immediate neighbourhood, pointing out that textbook description was inadequate and generally inaccurate. Pathologically tumours were usually adenomata or cysts; primary atrophy was rare; it was generally a pressure atrophy. Treatment was advocated before general pressure took place. A tumour of the anterior lobe occurring before puberty resulted in gigantism, and after puberty in acromegaly. Another group of cases resulted from diminution in the anterior lobe secretion. Posterior lobe cases were of the type of adiposa dolorosa. He recommended attacking the pituitary by the frontal route, elevating the frontal lobe of the brain. He had operated on seven cases with no special technical difficulty; the mortality was 30 per cent. Three papers on the operative treatment of fractures, from different points of view, were presented by Messrs. G. H. Edington, Archibald Young, and Donald Duff. Mr. Edington was strongly in favour of regarding the plate as a foreign body to be removed between the third and fourth week. Mr. Young showed an excellent series of slides illustrating various methods of dealing with fractures, especially wiring, pinning, or nailing, sometimes using a long nail, sometimes a fine short sprig, plating and screwing. Open operation for fractures was carried out in 39.25 per cent. of the series of cases, which represented the work of the past five years. Of those cases treated by open operation, direct fixation of fragments was carried out in 37.86 per cent. He found that the number of cases in which open operation with fixation was required was increasing on account of the more satisfactory results obtained. Mr. Duff's paper, which was also fully illustrated, was a statement of the work carried out by him in bone operations resulting from the war. He discussed fully the different methods of bridging the gap in the bone; he thought

that the inlay graft gave on the whole the best results. At the close of the session Sir Arbuthnot Lane expressed his gratification at the results of the work of which they had heard that morning.

Friday, July 28th.

The subject chosen for discussion in the third session of the Surgical Section, the treatment of non-malignant affections of the colon, appeared to be the most attractive of all. The audience which assembled under the presidency of Mr. James Berry, a vice-president of the Section, was the largest seen for many years. Whether the subject itself attracted the audience or whether the prospects of a lively debate between such well known and distinguished surgical authorities as Sir W. Arbuthnot Lane, Mr. George Waugh, and Sir Henry Gray, provided attraction or not, is immaterial. In leading, Sir Arbuthnot Lane presented his now well-known theories in an exceedingly attractive and systematized paper. He said there were two great groups of conditions found in the living abdomen—namely, those cases of intestinal stagnation in which reaction took place, and those in which it was absent. The first of these was a group characterized by the formation of bands. The "first and last" kink, a band controlling the lumen and the lower parts of the bowel, was the most important acquired change in the whole body, since it was the primary cause of a vast amount of static trouble in the intestinal tract and elsewhere. Various other localities were affected by the development of bands: immediately above the iliac crests, at the splenic flexure, below the gall bladder, where the band held up and obstructed the transverse colon over the outer aspect of the caecum (Jackson's membrane), and lastly, on the under surface of the terminal mesentery of the small intestine (Lane's ileal band). All these so-called separate bands were evolutionary, and were due to the effort of the organism to meet with abnormal loading up of the bowel because of a distal obstruction. Then came the group characterized by the absence of bands. In this second type of the static colon the mechanical difficulties were the elongated pelvic colon and the obstruction consequent upon it and the inflammation of its mucous lining. The symptoms calling for operation were due to autointoxication, which was the result of infection of the contents of the small intestine. The simplest operative procedure might be to excise the surplus pelvic colon, but in the great majority of cases the best results were obtained by colectomy, or by dividing the ileum and uniting it to the pelvic colon.

Mr. Waugh presented a reasoned statement on the structural variations of the colon, based upon observations made in 518 operations and on a study of *post-mortem* examinations in 110 children under the age of 12 years. He discussed also the symptomatology of the cases presented, and came to the conclusion that undue mobility of the ascending colon was the prime factor in the majority, while others had, in addition, various prolapses affecting the transverse colon, stomach, and right kidney. The operative procedure performed in 210 cases was fixation of the ascending colon to the posterior abdominal wall in what approximated to the normal position. Sir Henry Gray maintained that all these various bands were developmental in origin. Abnormalities in the mobility in the various parts of the colon were due chiefly to the increase or decrease in the fusion of, or in the length of, various folds in the peritoneum formed in connexion with the development of this part of the bowel. Jackson's membrane he regarded as an exceedingly common structure, and it was present to a greater or lesser extent in the majority of patients operated on by him. Jackson's membrane he regarded as developmental, being simply the extension to the right of the omentum. He advocated strongly an extensive paracentral incision so that the variations of intra-abdominal structure might be thoroughly investigated and dealt with. Very few cases called for the complete resection of the colon advocated by Lane. This operation was justified only in grave stasis in various parts of the colon and when exploration showed that the colon was an unusually long and hypertrophied one, and affected by adhesions which interfered with its mobility. Mr. Herbert J. Paterson (London) and Mr. A. J. Walton (London) also spoke.

Mr. D. P. D. Wilkie (Edinburgh) read a paper on chronic duodenal ileus, illustrated with lantern slides. The paper was afterwards discussed by Mr. Dingley (Wednesbury), Mr. Clay (Newcastle-on-Tyne), and Sir Kennedy Dalziel (Glasgow). The last contribution to the work of the Section was by Mr. H. S. Souttar (London), one of the honorary secretaries, who described a method of dealing with difficult hernias, the essential feature of which was darning the opening with mercurialized silk. Mr. Berry formally closed the Section, expressing the gratification of the officers at its success, and at the good attendance not only by surgeons but by other members of the profession.

SECTION OF DERMATOLOGY.

Thursday, July 27th.

DR. O'DONOVAN (London), in opening a discussion on occupational dermatitis, said that in skin diseases the industrial aspect was appreciated more than in any other branch of medicine. The effect of work and stress was more obvious as the cause of skin affection than in any other departments, but it was necessary to investigate the occupation of patients exactly in order to find out what they really did. It was not enough to know that the patient was merely a fireman or a baker without a statement of his exact work. Occupational dermatitis could be grouped according to the nature of the cause. He gave several instances of eruptions caused by rubbing; sometimes the rubbing was aided by syphilis. Dirt was not necessarily a cause of dermatitis. The necessary factor was a cleaning process in which the cleaning fluid came in contact with the skin; the fluid might be water, or acid, or alkali, or benzine, or naphtha, or petrol, etc. Dermatitis was caused by other things also—for example, by vegetable substances. Sugar itch and baker's itch, although well known, he had not often met with. The most chronic cases were those due to formalin and phosphorus. It must always be remembered that the types of industrial dermatitis met with in one's own practice depended on the industries of the neighbourhood. When starting a new industry dangerous to the skin it was essential, though perhaps brutal, to discharge at once all those workers sensitive to the noxious material. Thus a corps of workers immune to trouble would be gradually built up.

Dr. Legge (Chief Medical Inspector to the Home Office), after congratulating the first speaker, said that ocupational dermatitis was a clinical rather than an administrative problem. He classified irritants into four kinds: (1) Chemical irritants, such as bichromate, acids, and certain finished dyes—for example, aurantia, which was last used in the German bombs dropped on London; (2) substances which resolve the natural fat in the skin—for example, turpentine, benzine, and its derivatives, the worst being dinitrochlorbenzine; (3) macerating substances—for example, water or watery solutions; (4) any process which mechanically injures the continuity of the skin, such as brushing, scratching, and rubbing.

The most interesting problem was that of prevention. He referred to the fetish of the wash-basin, which the medical inspector always asked for in the factory, but washing was bad for eczema when established. He thought the proper preventive treatment was, after work, to rub in a greasy preparation—for example, lanoline, to restore the fat washed out during work. Chrome ulceration was at least thrice as common as tar and pitch dermatitis, but never became carcinomatous. Workmen might find powder useful both on their faces and scrota for preventing the bad effect of tar. Dr. Norman Walker (Edinburgh) said he had been long interested in occupational dermatitis. He desired to say how much had been gained by co-operation with the Home Office, and from intelligent co-operation between the factory doctor and the workman. He gave a good instance of this in the paraffin industry. He thought the idiosyncrasies of various skins to various substances was a factor of great importance. Dr. Gardiner (Edinburgh) said that of all the cases of dermatitis seen by him at least 66 per cent. were due to occupation, but in 14 per cent. the dermatitis was preceded by a definite illness, and 63 per cent. showed a preceding skin abnormality—for example, seborrhoea or hyperidrosis. Slight alteration in the materials used and local injury were important factors. Dr. Lancashire said that the possible sources of irritation were legion. He mentioned novocain as an unusual one, although it had been described previously in America.

The President (Dr. Leslie Roberts, Liverpool) referred to the points mentioned, and desired to draw some general conclusions. He emphasized the importance of examining the entire surface of the body in every patient suffering from dermatitis. The basis of idiosyncrasy seemed to be chemical, often some foreign protein or carbohydrate. Hence in preventive treatment diet might play an important part.

Subsequently Dr. Goodwin Tomkinson (Glasgow) read a short paper on alopecia areata as a family disease. Out of eleven members of a family eight suffered in a varying degree, and seven had strabismus. This group of cases seemed to give support to the theory of the nervous causation of alopecia areata.

DISEASES OF CHILDREN.

Thursday, July 27th.

ON July 27th the Section discussed treatment of tuberculosis of the cervical glands. Mr. John Fraser (Edinburgh) said that there existed a wide divergence of opinion as to the correct treatment of tuberculous cervical glands. Nevertheless it should be possible at a meeting such as this to formulate a definite scheme which would guide the practitioner in his advice to a patient. Lymphatic glands might be infected via the blood or via the lymph stream. The latter comprised about 90 per cent. of the cases, but the distinction was an important one, because in the former operation was contraindicated. Clinically it was possible to distinguish between the two groups, because with a blood infection multiple scattered glands were attacked, whereas with a lymph infection the disease remained for a long time confined to one or two adjacent glands. Pathologically caseation occurred in the centre of the gland in blood infections and at the periphery in lymph infections. In the lymphatic variety the primary focus was in the tonsil, nasopharyngeal adenoids, or in carious teeth. Unlike most other forms of tuberculosis, the early stages were not associated with a general infection. There were three pathological types of tuberculous infection in glands—the caseating, the lymphoid and the fibrous. The caseous variety was the most common. In children under one year the disease generally ran an acute course; with each successive year increasing resistance was developed. Tuberculosis of glands was preventable in 90 per cent. of the cases by sterilization of milk and care in seeing that the child did not come into contact with a case of open tuberculosis. As regards treatment, the speaker did not believe in complete cure by non-operative measures, although the disease might be rendered quiescent. There was no direct specific anti-bacterial agent for tuberculosis. That being so, he recommended thorough complete removal of the affected glands wherever operation was not definitely contraindicated. The results were eminently satisfactory, because in the lymphatic type of tuberculosis the disease was localized and therefore capable of complete eradication. Under certain conditions, however, operation was strongly contraindicated. These were: irregular, haphazard distribution of the disease, suggesting blood-borne infection; the fibrous type of disease, where incision or curetting had already been performed; and in the first year of life.

The President, Sir Herbert Waterhouse, agreed with nearly everything that had been said. He was especially glad that stress had been laid on the local character of cervical tuberculosis. This meant that the patient was radically cured when the glands were removed. As far as his experience went there was no other cure. The fibroid and lymphatic types of gland were, however, best left alone. As regards the type of bacillus, the human was relatively common in London, although it seemed to be rare in Edinburgh. He wished to enter a protest against treatment by *x* rays. In the lymphatic type of the disease, when glands were very large, they might do some good, but they rendered subsequent operation extremely difficult. He had never seen a cure follow their use. Mr. Grey Turner (Newcastle) said that he was sorry to be called upon at this early stage of the discussion, because he had found nothing upon which he could differ from previous speakers. He agreed with Mr. Fraser's grouping of cases, and thought that many of the bad results seen twenty years ago might have been obviated had the differentiation between local and general disease been understood. The tubercle bacillus usually gained entrance via the tonsil during the first year of life. It could be found in the tonsil in a large proportion of younger children, but seldom in older cases. He had no objection to operation under one year of age. He gave the after-results in a series of cases which had been operated on five to eighteen years previously. Out of 83 cases 54 were quite well, and 15 had one or two slightly enlarged glands mostly on the side opposite to operation. He recommended removal of the glands at as early a stage as possible.

Mr. Alexander Mitchell (Aberdeen) said that in Aberdeen, as in Edinburgh, tuberculosis of cervical glands was particularly common. He thought the milk supply was largely responsible. Unfortunately when milk was sterilized some children did not thrive; it was therefore better to eliminate tuberculosis from cattle. Tuberculosis of glands had diminished since the medical inspection of school children and the removal of diseased tonsils and adenoids. As regards treatment he first dealt with the focus of infection; he then exposed the case to sunlight for two or three weeks; if there was then no improvement he operated. He thought that all cases could be cured by thorough dissection, but that in a few suitable cases curetting was preferable; it was a less serious operation and left a smaller scar. Dr. Thursfield (London) said that he saw comparatively few cases of tuberculous cervical glands in London, probably because they generally went to the surgeons. The danger of insisting on bovine tuberculosis as a cause was that the very numerous cases due to the human bacillus might be overlooked. The cases of generalized tuberculosis in infants where the primary focus had been in the cervical glands were generally of the human type, and the child had nearly always been in contact with cases of open tuberculosis. Mr. MacLennan (Glasgow) said that the present treatment of milk was a disgrace, and Government interference to put a stop to the use of tuberculous cattle was urgently called for. Cases often began as a mixed infection. There might be tonsillitis, or rhinitis, and tubercle bacilli were introduced along with pyogenic organisms. In Glasgow a very large percentage of cases were due to the bovine bacillus. He did not approve of *x*-ray treatment, and advocated operation even when an abscess was present. He showed lantern slides illustrating various types of cases. Mr. L. A. Parry (Brighton) said the majority of cases in London were due to the bovine bacillus, and that 10 per cent. of samples of London milk were infected with active tubercle bacilli. Prevention of the disease was extremely important. The supply of non-tuberculous milk was a means to this end. Attention to tonsils and teeth had done much to diminish the incidence of the disease. Operation should be performed as soon as the diagnosis was certain. Dr. Warden (Paris) did not agree with the surgeon's point of view. The profession was greatly divided on the question of operation. Medical treatment had yielded magnificent results, especially from heliotherapy. Tuberculosis of glands of the neck was a symptom of social and economic disease. The public should be enlightened on the subject of tuberculous milk. Dr. Herzfeld (Edinburgh) had followed up a hundred cases of operation in her clinic. There had been only one recurrence. Natural cure might, however, take place. In her series 48 per cent. had recovered without operation, but it was too soon to say if the results were permanent. Dr. Mackenzie (Manchuria, China) said that in China there was no bovine tuberculosis because the people did not drink milk. Human tuberculosis was extremely prevalent and many girls suffered from tuberculosis of cervical glands. The boys were less liable because they lived a more open-air life. Dr. Denison Smith said that surgeons often did not see the first stage of the disease, which usually began as a mixed infection. He had obtained good results in 45 per cent. of cases by aspiration of single glands.

Demonstration at the Royal Hospital for Sick Children.

On the afternoon of July 28th the Section of Diseases of Children attended demonstrations at the Royal Hospital for Sick Children. Dr. Alexander Mitchell showed skiagrams of regeneration of bone following resection of the shaft for osteomyelitis. In one case the shaft of the tibia had been completely removed, and the bone had regenerated from the periosteum. There was no shortening and no disability. A similar result had followed resection of the lower half of the femur for the same condition. Mr. Alex. MacLennan showed a series of cases of scoliosis. Some were due to congenital malformations. In the acquired type heredity generally played a part. He discussed the various causes of acquired scoliosis, but had come to the conclusion that the accepted causes did not account for the majority of cases. In his view scoliosis was due to an overgrowth and elongation of the bodies of the vertebra while the posterior parts remained stationary. The only possible way in which the spine could accommodate itself to this state of things was by rotation of the vertebrae, such as occurred in scoliosis. Scoliosis was due to rotation of vertebrae, not to lateral curvature. He explained the treatment by the Abbott method and by operation. He then gave a cinematograph demonstration of the gait in various diseases affecting the hip-joint.

SECTION OF INDUSTRIAL DISEASES AND FORENSIC MEDICINE.

Thursday, July 27th.

ON July 27th a paper on some factors which make for efficiency and for the social uplifting of industry was read by Sir Thomas Oliver, who pointed out that the subject of "industrial efficiency" could hardly be discussed without its obverse "industrial inefficiency." There could be no industrial efficiency without healthy workpeople. Men must be fit for their job, and those who were fit must be kept fit. There could be no disassociation of employment from home life and the manner in which leisure hours were spent. What public health had accomplished industrial hygiene, its twin sister in the department of preventive medicine, was making an effort to attain. The periodical medical examinations of workers was a matter which called for attention. A medical examination should not be a deterrent but a guide as to the particular kind of work which should be undertaken, and the early years of life were to be considered the vulnerable period. The subject of "group life" insurance was considered in some detail. The paper was discussed by Mr. W. Salisbury Sharpe, who referred to the differences in blood pressure found in various occupations; also by Dr. Scott, Mr. G. E. Orme, and the President.

Dr. James R. Kerr gave a paper on the treatment of industrial accidents. He pointed out that the treatment of an industrial accident had a very close interest for the participants in both its immediate and its remote results. Reference was made to the organization of the factory medical service for dealing with industrial accidents as met with in England and in other countries. While there was good provision for the immediate and immediately subsequent treatment of accidental injuries, there came a stage in the progress of the case when there was no adequate provision for the next essential procedure towards the restoration of the patient to his working capacity, and organized hospital treatment was required. Dr. McVail, Dr. Salisbury Sharpe, and Dr. Coles took part in the subsequent discussion. Dr. John Glaister, jun., read a paper on some new apparatus for the estimation of the working capacity of an upper extremity, and demonstrated the apparatus, which consisted essentially of a box inside which were a number of weights which could be lifted by means of rods passing through the top of the apparatus, the person examined being ignorant of the nature of the weight he was lifting. Dr. Alexander Scott, in a paper on the occupation dermatoses of the paraffin workers of the Scottish shale oil industry, discussed occupation comedones, folliculitis, pustular dermatitis, papular dermatitis, erythema, and epitheliomata, and showed numerous lantern slides and photographs.

SECTION OF PHYSIOLOGY.

Thursday, July 27th.

AT the morning session on July 27th Professor D. Noël Paton occupied the chair, and expressed regret for the unavoidable absence of the President of the Section, Professor J. A. MacWilliam, Aberdeen. The discussion on the subject of basal metabolism was opened by Professor E. P. Cathcart, who emphasized the importance of basal metabolism not merely for the physiologist but also for the practitioner. Basal metabolism was the minimum metabolism compatible with life. It might be expressed as oxygen intake or as energy expenditure. There was no such thing as *normal* basal metabolism; every individual had his own, which showed a remarkable constancy. Basal metabolism, however, was influenced by many factors. There was a diurnal and a seasonal variation. Athletic or sedentary mode of life played a part. But what was of greatest importance from the clinician's point of view was the factor of the patient's condition of nutrition. Clinicians generally saw people in an abnormal state of nutrition. On account of the numerous factors influencing basal metabolism there was a danger of the physician being overwhelmed with an accumulation of utterly worthless data. Dr. J. B. Orr referred to the difficulties of determining basal metabolism, and to the influence of the psychic condition of the subject and the state of the endocrine glands. When the lowest level of metabolism was reached they were dealing really with a pathological condition, intake of nourishment being a normal function of the cell. The conception of basal metabolism was really an abstraction, what was observed was different levels of metabolism. Professor J. C. Meakins said that the value of observations on basal metabolism depended on the care with which they were made. If proper precautions were not exercised a valuable method for the study of disease might fall into disrepute. He described the conditions of observation in his wards and emphasized the importance of mental apprehension as a factor. Sometimes dummy experiments were necessary to overcome this difficulty. He showed slides demonstrating the result of treatment on basal metabolism in cases of thyroid disease, and of the effect of adrenalin injections on basal metabolism, respiratory quotient, and blood sugar. Dr. G. B. Fleming discussed the influence of age and growth on the basal metabolism of children. The fact must not be overlooked that in such cases growth was going on during the course of the observations. Dr. Leonard Hill spoke of observations on basal metabolism, with special reference to the rate of cooling as observed with the kata-thermometer. Any obstruction to breathing raised the level. One of the greatest benefits of open-air treatment was that it raised the basal metabolism. This was due to the air and not to sunlight. Dr. C. M. Wilson referred to the question of depth of pulmonary ventilation and to subjects in a state of emaciation. He showed slides illustrating the benefit derived in a number of cases of menorrhagia of exposure of the thyroid to x rays. Professor Cathcart, in reply to a request from the Chairman, admitted the difficulties of determination. Basal metabolism was due to the interaction of a large number of factors. Personally he was inclined to associate it with muscle tonus.

Mr. G. Hunter contributed a paper on the diazo-reaction of the urine, with particular reference to measles. Various modifications of the diazo reagent were discussed. The importance of using sodium carbonate as alkali and the necessity of adding this to the acid reagent before the solution to be tested were pointed out. The diazo-reaction of a mixed measles urine was shown to be due—to the extent of about 85 per cent. of the colour value—to histidin. Approximately 0.1 gram of pure histidin monohydrochloride was isolated from a litre of urine estimated to contain 0.31 gram. The remaining colour was mainly due to some phenolic substance which was not isolated.

At the afternoon session a combined meeting of the Section and of the Physiological Society was held. The following demonstrations and communications were given: 1. A method of demonstrating arterial blood pressure to large classes. The action of guanidin on the cardiac inhibitory mechanism (Professor D. Noël Paton, Professor D. Burns, and Mr. J. McColl). 2. The influence of oxygen on the pulmonary circulation (Dr. N. Morris). 3. Notes of Thunberg's succino-dehydrogenase (Dr. G. M. Wishart). 4. Laevulose in human foetal blood (Mr. A. P. Orr). 5. The influence of calcium on the absorption of phosphorus from the gut (Dr. S. V. Telfer). 6. Postural alterations in the respiration of the rabbit (Professor D. Noël Paton). 7. The effect of sunlight on rickets (Dr. Leonard Hill). 8. The influence of the type of work on mechanical efficiency (Professor E. P. Cathcart, Miss E. M. Bedale, and Mr. G. McCallum). Later in the afternoon Professor Cathcart showed (1) a new type of ergometer designed by Professor Cathcart, Dr. Wishart, and Mr. McColl; (2) the latest type of Benedict-Roth-Collins respiration apparatus for determining basal metabolism.

RADIOLOGY AND ELECTROLOGY.

Thursday, July 27th.

A DISCUSSION on the therapeutic value of static electricity was opened by Dr. Howard Humphris (London). He said that there were six chief modalities obtainable for therapeutic purposes: the static bath (also known as the static charge), the wave current, the static induced current, the brush discharge, the static spark, and the high potential vacuum. He described each of these in turn and pointed out their advantages for particular conditions, concluding with the remark that static currents were replaceable by no other form of electricity, and with a competent knowledge of their uses therapeutic effects could be obtained from them which appeared marvellous to anyone using them for the first time. To get these effects consistently, however, it was necessary to have a knowledge of the subject of static electricity and of the nature of the disease to be treated, and to have a static machine of efficient power. Dr. W. F. Somerville (Glasgow) gave an account of high-frequency currents. He brought forward evidence to show that under the influence of these currents definite physiological actions were produced in the

tissues and functions of the body, and that some of these actions were capable of actual demonstration and of precise measurement; also that certain forms of organic disease were favourably influenced by the application to them of high-frequency currents. He arranged the evidence under three headings: (1) the effects of high-frequency currents on the surface temperature of the body; (2) their action on tissue metabolism, as indicated by qualitative changes in the composition of the urine; (3) their therapeutic efficacy in diseased conditions in which the element of suggestion either did not exist at all or was reduced to a minimum. After a brief discussion in which the President and others took part, a number of papers on *x*-ray subjects occupied the remainder of the session. The first of these was an account of the Bucky-Potter diaphragm and a lead-glass shield as used for the 7-inch Coolidge tube. This was read by Dr. H. E. Gamlen (Newcastle), who said that the function of the Bucky-Potter diaphragm was to absorb the scattered rays which were generated within the tissues of the body owing to the action of the primary radiation in passing through. The diaphragm prevented the secondary rays from reaching the film or plate, and thus caused better contrast and definition. Dr. C. W. S. Saberton (Harrogate) gave a description, assisted by many slides, of the *x*-ray appearances in bone disease, with a view to differential diagnosis between simple and malignant cases. His illustrations principally related to osteitis fibrosa, which was liable to be confused with certain other diseases which might simulate it; and in arriving at a diagnosis the clinical history must always be considered in conjunction with the *x*-ray findings. Dr. James Crocket (Glasgow) read a paper on the differentiation of active from quiescent tuberculosis of the lung. He traced the radiological development of advancing tuberculosis: first a diffuse haziness of the affected area and enlarged trunks radiating from the hilum, these trunks afterwards becoming more accentuated, while budding, rounded or oval in form, appeared on certain branches; the buds afterwards became larger and more numerous, the shadows more dense, and the whole lung at last became dark, save for the light areas significant of cavity formation. Dr. E. W. Reed (Manchester) spoke on the *x*-ray treatment of diseases of the skin. The conditions contraindicating *x*-ray treatment he divided into general, such as grave blood diseases, and local, such as acute inflammatory conditions; the prompt application of *x* rays was indicated when there were indurations and thickenings, itching, chronic infiltrations, lichenification, conditions requiring depilation, and, finally, new growth. The closing paper was read by Dr. Gibson Graham (Glasgow) and recounted the author's twelve years' experience of the *x*-ray treatment of tinea. Although he had treated children under two years of age, he had never seen any sign of impaired mental function which could be attributed to *x* rays.

SECTION OF OPHTHALMOLOGY.

Thursday, July 27th.

THE chair was taken on July 27th by Dr. John Rowan, a vice-president of the Section. The subject for discussion, the clinical significance and treatment of heterophoria, was introduced by Mr. A. S. Percival of Newcastle, President of the Section, who said that he would make his introductory remarks brief, so that their distinguished guest, Dr. L. Webster Fox of Philadelphia, might be able to develop his thesis at greater length. Dr. Fox was given a most enthusiastic welcome, and in his paper he dealt with those aspects of this complicated problem which they in the United States were at this time most actively following. A keen discussion followed, in which there participated Messrs. J. A. Wilson (Glasgow), Charles F. Harford (London), Inglis Pollock (Glasgow), Bishop Harman (London), Gray Clegg (Manchester), Herbert Caiger (Sheffield), Thomas H. Bickerton (Liverpool), J. J. Healy (Llanelly), G. M. Harston (Hong Kong), Stewart Barrie (Glasgow), Lindsay Rea (London), John Rowan (Glasgow). The discussion concluded by replies from Dr. Percival and Dr. Webster Fox. A paper on a case of ophthalmic migraine with unusual symptoms was read by Dr. A. R. Moodie of Dundee; and a paper on the education of partially blind children in myope classes, by Dr. H. Wright Thomson of Glasgow; this was discussed by Mr. Bishop Harman and Dr. John Rowan. Dr. Herbert Caiger of Sheffield communicated a note on conjunctivitis artefacta, which was discussed by Messrs. T. H. Bickerton, Peter Macdonald of York, A. S. Percival, and A. R. Moodie of Dundee. The final paper for the day gave an account of the venereal disease clinic of the Glasgow Eye Infirmary, and was communicated by Dr. E. J. Primrose; to this there followed remarks by Dr. Ballantyne of Glasgow, Dr. Wilson of Huddersfield, and Dr. John Rowan.

Friday, July 28th.

A clinical meeting was held at the Glasgow Eye Infirmary under the direction of Dr. A. J. Ballantyne, vice-president of the Section. A large series of demonstrations were arranged by officers of the Section besides clinical cases. Dr. John Rowan (Glasgow) showed stereoscopic photographs in natural colouring; Dr. A. J. Ballantyne showed drawings of abnormal retinal vessels; Mr. A. S. Percival gave a demonstration of the light sense test; Dr. George Mackay exhibited a motor trephine; cases were shown by Messrs. John Rowan, Wright Thomson, Garrow, Ballantyne, Leask, Hislop Manson, Inglis Pollock, Barbour Stewart, E. J. Primrose, and others. The arrangements made for the demonstration of the cases were excellent, and the thanks of the visitors were tendered to the officers of the Section and the staff of the hospital.

Reports of Societies.

OXYGEN WANT.

AT a meeting of the Edinburgh Medico-Chirurgical Society held on July 5th, with the President, Sir ROBERT PHILIP, in the chair, Professor J. C. MEAKINS read a paper on oxygen want, its causes, signs, and treatment, in which he discussed the importance of oxygen in physiological and pathological conditions. Having reviewed the means whereby the blood acquired oxygen from the lungs and the importance of the peculiar character of the dissociation curve of oxyhaemoglobin, he mentioned how the tissues acquired oxygen from the capillary blood. He then summarized the causes of oxygen want and demonstrated the close relationship between delirium in pneumonia and oxygen want as determined by the arterial oxygen saturation and cyanosis. The interference with the respiratory function in lobar pneumonia, bronchopneumonia, emphysema, and asthma was discussed in detail, while the protection of dyspnoea and cyanosis in cardiac diseases was interpreted both from the point of view of the oxygen saturation of the arterial blood and also of the minute volume of blood flow through the heart. Having demonstrated the causes of orthopnoea and Cheyne-Stokes breathing, and shown how these conditions could be relieved by the administration of oxygen, Professor Meakins next considered the influence upon the organism of abnormal composition of the atmospheric conditions in mines and other places. In carbon monoxide poisoning the grave results were consequent upon the formation of carbon monoxide haemoglobin in place of oxyhaemoglobin. When the individual was removed from the abnormal environment the carbon monoxide was soon removed from the body, and any after-effects were the result of oxygen want occurring during the period of poisoning.

Dr. WITRIDGE DAVIES dealt with methods of oxygen treatment. He ascribed failure of oxygen therapy to its exhibition in unsuitable conditions or to faulty technique. The essential consideration was to raise the oxygen percentage, and therefore the partial pressure of oxygen in the air of the lung alveoli, thus giving the oxygen a greater *vis a tergo* in its passage through damaged lung epithelium. Dr. Davies then described the oxygen chamber, the Haldane apparatus, the nasal catheter method, and various emergency methods of oxygen administration.

Surgical Diagnosis of Renal Diseases.

Mr. HENRY WADE read a communication on the choice of methods employed in the surgical diagnosis of renal diseases. In only two types of cases—injury and acute fulminating pyonephrosis—was operative treatment justified without careful preliminary investigation. It was wise in such cases to open the abdominal cavity and examine the other kidney. His routine investigation in the ordinary case comprised the clinical examination, including chemical, cytological, and bacteriological examination of the urine, an *x*-ray photograph of the bladder and both kidneys and ureters, and the use of the cystoscope. Mr. Wade then discussed the indications for ureteral catheterization, pyelography, the use of the *x*-ray catheter, chromocystoscopy, and renal pelvic lavage. Ureteral catheterization was of value in investigating the source of

blood or pus in the urine. In intermittent haemorrhage his custom was to wait till the haemorrhage was taking place; while one had to remember the possibility of the catheter itself causing a little bleeding, a brisk flow of bright blood should suggest a neoplasm. In pyuria he favoured bilateral catheterization, and with certain precautions this procedure was without danger. Pyelography was useful in confirming the diagnosis of renal tumour because of the characteristic alteration in the shape of the calyces it produced; it was the only sure method of determining the nature of a suspicious shadow, such as that caused by stone, and was helpful in deciding whether or not an abdominal swelling was renal in origin—for example, a displaced kidney. He preferred the *x*-ray catheter to the wax-tipped bougie in investigating a doubtful shadow in the line of the ureter. The indications for and technique of renal pelvic lavage were also dealt with. To determine the renal function as a whole, blood analysis was of more value than chromocystoscopy, and in the elderly prostatic was an indispensable guide as to when operation could safely be performed.

Reviews.

ARTIFICIAL LIMBS AND AMPUTATION STUMPS.

MR. MUIRHEAD LITTLE tells us that an artificial foot is referred to by Herodotus as in use as early as 500 B.C., and that at the Royal College of Surgeons there exists an artificial leg found in an Italian tomb at Capua and dating from at least 300 B.C., so that the history of prosthesis is certainly a very ancient one. A sixteenth-century artificial arm is in existence in the Nuremberg Museum, and Ambroise Paré gives descriptions of both arms and legs of considerable complexity, the artificial arms having mechanical hands and fingers working by springs, ratchets, and catches. During the nineteenth century much progress in prosthetic appliances was made, chiefly as the result of attempts to fit men who had been injured in the great wars. Baliff, after the Napoleonic wars, was the first to suggest the use of the shoulder and trunk muscles to work the mechanism of an artificial hand through connecting cords, a method which is now used very extensively in mechanical arms. After the Crimean and Italian campaigns of the French Empire de Beaufort devised several mechanical arms worked in this way, and also invented a very cheap and simple artificial leg. The recent great war has yielded an experience in the fitting of artificial limbs which is unique in history. The total numbers fitted under the auspices of the Ministry of Pensions, excluding members of the Overseas Forces, are:

Lower extremity	...	...	29,950 (72.5 per cent.)
Upper extremity	...	...	11,350 (27.5 ,, ,,)
Total		...	41,300

Mr. Muirhead Little has probably had a greater opportunity of gaining experience in the fitting of limbs than any other surgeon in this or any other country, and from this experience he has written so concise, lucid and complete a work upon the subject that his book, *Artificial Limbs and Amputation Stumps*,[1] must form a classic for a very long time to come.

It is impossible to do more than select from this work a few items for comment. A chapter on amputation stumps considered from the point of view of the fitting of artificial limbs gives a guide which is essential for every surgeon, for anyone may have to perform an amputation, and it is a confession of failure if the resulting stump is unsuitable for the fitting of an artificial limb. It is to be feared that cineplastic amputations, to which the author devotes the greater part of a chapter, have already become obsolete, the power of the motors being insufficient and the difficulty of fitting a useful prosthesis almost insuperable.

The British official prostheses, to which a considerable portion of the book is devoted, represent the result of all the accumulated experience of the recent and all past wars, but finality has not yet been reached. Only those types which are strong and useful have survived, and many inefficient appliances have been eliminated. The artificial arms are divided into three groups: those for hard work—"Heavy Workers' Arms," those for light work—"Light Workers' Arms," and those for ornament—"Light Dress Arms." The heavy workers' arms have, as a rule, detachable forearms and hands, so that tools may be fitted instead. The dress arms are shaped like a natural arm, the forearm and hand not being detachable. The metal parts are of steel or duralumin, the sheaths or shaped parts being of duralumin, leather, or certalmid—the latter a fabric and glue composition, which has been devised in the experimental workshops of the Ministry of Pensions, and which is very light and strong. Mechanical movements of the artificial arm and hand have been extensively developed, and show great ingenuity. The chief stimulus to the production of these has been the Carnes arm, a clever appliance introducing a wonderful imitation of flexion of the elbow, pronation of the forearm, and a mechanical hand grip. Appliances to be used instead of the hand are innumerable; the only apparent difficulty is the selection of those suitable for individual workers. Possibly too many of these have been devised, for, as Mr. Little says, "a visit to a workshop, where a large number of one-armed men are employed, shows that, as a rule, only simple appliances are used." For special work, however, implements of a more elaborate nature may be very useful; as an example may be cited the draughtman's appliance, made by Mr. N. B. Jones for his own use.

A prosthesis for the lower limb is a simpler matter than one for the upper. It is, as a rule, inadvisable to provide for all the normal movements in artificial hip and ankle joints, because the muscles that should control these movements are wanting. The simpler the mechanism of an artificial leg the better, and the British official types of limb may be said to standardize the simplest mechanism which is really strong and reliable. Much controversy has centred around the weight of artificial legs. Mr. Little has always maintained that prostheses, especially for the lower limb, cannot be too light, provided that they are strong enough. He has measured limbs systematically at the hospital at Roehampton, and has come to the additional conclusion that the distribution of the weight is even more important than is the total weight. It should be the aim of the designer and manufacturer to raise the centre of gravity as much as possible, so that the distal part of the limb is kept very light. A further point may be put in a patient's own words: "When the socket fits me properly the limb feels no weight at all, but when it is too loose it seems to weigh a ton." Light metal limbs made of duralumin were just coming into use at the beginning of the war. Until comparatively recently the price has been such as to prevent a general issue of limbs of this type, but this difficulty has now been got over, and a footnote in Mr. Little's book tells us that the Ministry of Pensions is now issuing a light metal limb with a wooden socket to those patients who have short thigh stumps and other conditions necessitating a particularly light limb.

Many of the short chapters upon special subjects are of great interest, and will be of immense value to the surgeon in helping him to deal with difficult cases. As examples may be quoted a chapter on appliances for mutilations of the hand, one upon permanent peg-legs, and others on amputation of both the lower extremities, complicated amputations, and the repair of artificial legs. In addition, a short account is given of experimental work by cinematography upon the mechanism of the normal man's gait, and there is a chapter upon re-education of the amputated.

In an appendix full-working details are given. They include the specifications of the limbs which have been standardized by the Ministry of Pensions, an account of the method of using certalmid, and of the method of assembling a light metal limb made by the Ministry of Pensions.

[1] *Artificial Limbs and Amputation Stumps.* By E. Muirhead Little, F.R.C.S. London: H. K. Lewis and Co., Ltd. 1922. (Demy 8vo, pp. viii + 319; 267 plates and figures. 18 dols. net.)

SIXTY-FOUR YEARS A DOCTOR.

THE lean and slippered pantaloon was a picturesque figure enough, but a thought useless, his shrunk shank being controlled by a shrunk mind. It may have been his picturesqueness that caused him to be enshrined in a poet's phrase, but he must have been deadly to talk to. In fact it does not appear that anyone ever did talk to him; which was a pity, because if he had scratched his head hard enough he could probably—even on a very low estimate of his remaining mental capacity—have awakened a few remembrances of the panorama of life which had passed before his eyes. Fortunately in these modern days he has only a small part, for it is no longer indecorous to remain young in spite of advancing years, and it is somewhat of a disgrace to grow old (except in wisdom). By growing old we mean a gradually increasing impermeability to current impressions, a slow withdrawal

into a bi-valvular shell which opens rarely, and may or may not contain a pearl. Such an old mind is content with its own fixed horizon, its own set background of thought; it has forgotten how to press on. To ripen in wisdom is a very different thing, for this involves the continually open mind for ever weighing in judgement the new and the old, so that the new is put on as it proves itself worthy of adoption, and the old is cast off as it becomes effete.

"Different things delight different people. But it is my delight to keep the ruling faculty sound without turning away either from any man or from any of the things which happen to man, but looking at and receiving all with welcome eyes, and using everything according to its value." Thus Marcus Aurelius. "There is not a more interesting occupation for the mind of a medical man who has been fifty years in practice than a consideration of the benefits which have resulted to humanity from the discovery of chloroform, aseptic treatment, . . ." Thus Sir Charles Brown, the honoured octogenarian of Preston. That is a far cry from the lean and slippered gentleman, *sans* everything; and it is entirely in keeping with the wisdom of the philosophic Emperor. But there is this profound difference: whereas Marcus Aurelius enunciated his precepts with obvious self-consciousness, Sir Charles Brown has equally obviously practised his with perfect naturalness.

His book, *Sixty-four Years a Doctor*,[2] written at the age of 86, reveals the quality of his mind. The book has no conscious art, but it takes the reader right into the presence of the author, as though it were a conversation. It is entirely uncritical, and is simply a record of the things he has seen during his long life. Some of the reminiscences are distinctly quaint:

"Professor A. F. McGill at a meeting of the British Medical Association at Leeds on August 18th, 1889, described how he had already successfully performed the suprapubic operation for prostatectomy, and laid great stress on the fact that the mucous membrane was incised with scissors and the enucleation carried out with the finger. In an adjoining room there was the astounding and unique spectacle of seven or eight old men sitting on a bench with their prostates in bottles on their knees."

Again, with reference to a case of appendicitis (this, in December, 1886):

"I called into consultation the night before the patient died one of the most eminent surgeons in the north of England, and he wished me to inject into the patient's rectum an infusion made according to a prescription of which the following is an exact copy: Common shag tobacco 50 grs., boiling water 15 oz.: infuse for half an hour, cool and strain. Three drams to be used as an enema every half-hour till symptoms of collapse arise."

The author's subsequent comment on the situation thus created is as good as anything in the book. One more quotation must suffice:

"I recall the only occasion on which I saw paracentesis thoracis performed at King's College Hospital. It was in 1858. The fluid was conveyed not through a rubber tube into a basin, but through a piece of chicken's intestine, the distal end of which rested under the surface of water contained in a bucket."

To the layman, also, Sir Charles Brown speaks on many matters of general interest, such as the advances in means of transport; and of many well-known public men he has met, from famous medical men to the late General Booth. Indeed, much of the professional matter would be as intelligible as it would be profoundly interesting to anyone to whom the progress of medical science in the alleviation of suffering means anything.

The book is dedicated very appropriately to Sir Clifford Allbutt; and in a publisher's foreword it is stated that the profits from the sale are to be devoted to the Preston and County Royal Infirmary, with which the author has been associated since its inception. Thus Sir Charles Brown continues his benefactions, not the least of which has been in connexion with the Cambridge Research Hospital, which owes him much.

In September of this year Preston holds its famous Guild after the customary interval of twenty years. Sir Charles Brown must have seen as many of these celebrations as anyone else in the town, and it is to be hoped that Preston will use the occasion to further the object with which this book was written by one of its oldest and most widely honoured citizens.

[2] *Sixty-four Years a Doctor.* By Sir Robert Charles Brown, M.A., M.B., F.R.C.P., F.R.C.S. Preston: George Toulmin and Sons, Ltd. 1922. (Demy 8vo, pp. 193; 1 portrait. 7s. 6d. cloth; 5s. net, paper.)

"THE ENGLISH SPAW": HARROGATE.

DR. JAMES RUTHERFORD of Harrogate has laid students of the history of medicine under an obligation by reprinting from the first edition EDMUND DEANE'S *Spadacrene Anglica, or The English Spa Fountain*.[3] He has increased the debt by inducing Dr. ALEXANDER BUTLER, also of Harrogate, to contribute some biographical notes of Deane, who was an Oxford graduate and a physician in York, and on some others associated with the early days of Harrogate.

Deane's book is little known; very few copies of the first edition, which was published in 1626, seem to be in existence, and the commentators in this edition are able to show that an acquaintance with Deane's treatise would have prevented some errors that have become current about the early history of Harrogate. They establish the fact that the medicinal virtues of a spring on Harrogate moor were first, in modern times at least, recognized, not by Sir William Slingsby, who generally has the credit, but by an elder relative of his, also William, who had travelled much and found a resemblance between the water of Spa and that of the Tuewhit well, which was therefore given the name of "the English Spaw." The spring contained iron, as Deane and some other physicians of York were able to demonstrate by adding powder of galls, whereon, to the admiration of Mr. William Stanhope, an ingenious, that is to say curious minded, gentleman who accompanied the party, "the water changed colour, and seemed to blush in behalf of the country, who had amongst them so great a jewell and made no reckoning of it." There is still a Tewit well at Harrogate described as a weak carbonate of iron spring.

NOTES ON BOOKS.

MR. RUSSELL HOWARD'S *The Practice of Surgery*[4] has now reached its third edition. In it Mr. Howard has endeavoured to set forth the teaching of surgery current at the London Hospital. A work of this kind running to three editions in the course of eight years is one which may be said to have established itself. It is a good average textbook, free from violent prejudices and following the beaten track of established teaching. The illustrations are many, simple, and well chosen, but vary considerably in quality.

Dr. C. W. VALENTINE, Professor of Education in the University of Birmingham, has written a small volume, *Dreams and the Unconscious*,[5] in which he aims to give an account of the "new psychology" and to indicate what, in his opinion, is fairly well established and what is still speculative theory or hasty generalization. The book is readable and clearly written, but its subtitle, "An Introduction to the Study of Psycho-Analysis," is perhaps somewhat misleading, as the author does not accept the basic principles of Freud's teaching and only deals in a quite general and superficial way with his subject.

[3] *Spadacrene Anglica, or The English Spa Fountain.* By Edmund Deane, M.D.Oxon. The first work on the waters of Harrogate. Reprinted, with an introduction by James Rutherford, L.R.C.P.Edin., and biographical notes by Alexander Butler, M.B. 1922. Bristol: John Wright and Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent, and Co., Ltd. (Crown 8vo, pp. 133. 6s. net.)

[4] *The Practice of Surgery.* By Russell Howard, C.B.E., M.S.Lond., F.R.C.S. Third edition. London: Edward Arnold and Co. 1922. (Med. 8vo., pp. 1230; 523 figures, 8 plates. 30s. net.)

[5] *Dreams and the Unconscious: An Introduction to the Study of Psycho-Analysis.* By C. W. Valentine, M.A., D.Ph. London: Christophers. 1921. (Cr. 8vo, pp. 144. 4s. 6d. net.)

GENERAL PRACTITIONERS AND MEDICAL OFFICERS OF HEALTH.

IN a presidential address delivered to the conference of medical officers of health held during the congress of the Royal Sanitary Institute at Bournemouth last month Dr. W. J. Howarth, M.O.H. for the City of London, reviewed the relation between medical officers of health and other members of the profession, especially general practitioners. The State, he said, had contracted with one section of medical men to provide treatment to a defined section of the community, and had also established centres for treatment by another section of the profession. The officer of the local authority, the medical officer of health, in establishing these centres, at which payment might or might not be required, acted under instructions, and the scheme evolved might appear to encroach on the sphere of the general practitioner. Such a position might create in the profession discordant sections instead of a united whole. No effort should be spared to establish a

federation of all sections of medicine. To achieve this honest compromises, backed up by unswerving loyalty, must be made. A former member of the Cabinet had rightly insisted that the views of the profession should be expressed by a body representative of all interests.

The general practitioner, Dr. Howarth said, was to be regarded as the backbone of English medicine; there was no doubt that public opinion in medical matters was materially influenced by his support or criticism; his close relationship to individual families and the esteem and admiration generally felt for his self-sacrificing work made him a real representative of medicine in the eyes of the British public. This fact, combined with the growing recognition of the medical ideal that prevention as well as cure is a responsibility of the general practitioner, rendered it essential that the medical officer of health should use every endeavour to secure the goodwill and active co-operation of general practitioners in his public health proposals. Differences which had arisen in the past had been due generally to misunderstandings. One group had failed accurately to appreciate the objects of the other because means for mutual discussions and criticism had been inadequate or had not been sufficiently used. Medical officers of health were associated in one body which had recently varied its constitution in order to enable all those engaged in the medical work of local authorities to take part in its affairs and management. As a consequence the society would undoubtedly in time to come be even more fully representative of all sections of preventive medicine. Dr. Howarth then continued as follows:

General practitioners have several societies representing their interests, but I believe that the British Medical Association, whilst not only claiming to be representative of all sections of medicine, does actually contain a greater number of members belonging to the group of general medical practitioners than any other society. Here is an organization which some minor change in constitution would probably admirably fit the part of the central body which could provide the necessary means for educating the different sections of medical men in their respective aims and difficulties. Particularly does the organization seem suited for bringing into closer touch general practitioners and medical officers of health.

The difficulties experienced are that the policy of the Association is decided by the representatives in annual council assembled. At such a meeting representatives of sectional interests are not present, unless, of course, as the representatives of areas; as a consequence a section may consider itself aggrieved by an adverse decision, since the decision was arrived at without that full appreciation of the position which would have been the case had direct sectional representatives been able to take part in the debate.

These few points will indicate the lines on which it might be possible for future difficulties to be avoided. The Association may and probably does consider it is rightly entitled to be regarded as the exponent of medical policy. The claim, or the desire, whichever it may be, is to be applauded, provided it can show how sectional interests can receive adequate consideration and ensure a suitable balance of judgement. This proviso is surely not a difficult one; it simply requires an arrangement with the sectional interests to join in its work in respect of matters which are of mutual concern and which require public advocacy and common action. For example, it might arrange for representatives of sections to be directly elected as such to the Representative Body, and even before any final decision as to policy is reached educational methods might be provided for by arranging that a representative of the section should be elected to the Divisions and Branches of the Association, and that corresponding nominees of the Association should have seats on the divisions of the sections concerned. This reciprocal privilege should extend even to the councils of the respective bodies.

A proposal of this kind would surely make for an agreed and uniformed policy, and no section would lose its individuality or freedom of action if provision were provided for separate action, though such a contingency ought to be safeguarded by requiring the most careful and deliberate consideration and an exact statement of the difficulties in joint conference before detached action could be possible.

In conclusion, Dr. Howarth said that it was necessary for all engaged in preventive work to practise economy in the expenditure of public money; their proposals must be sound, and must have the support of the stalwarts of the profession—the general practitioners. Proposals on which opinions were divided were more than ever certain of rejection; practitioners and medical officers of health must get into closer touch, and with this object a greater measure of discussion in the privacy of society deliberations must be arranged.

INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE.

(*Concluded from page 222.*)

THE following are some additional notes of the proceedings of the International Congress of the History of Medicine in London, which came to an end on July 22nd.

Anatomy in Edinburgh.

Dr. J. D. COMRIE, in a paper on early anatomical instruction at Edinburgh, said that in the fifteenth century the brethren of the Guild of Surgeons and Barbers maintained an altar, where daily service was held, in the Collegiate Kirk of St. Giles, under the patronage of St. Mungo. In 1505 the guild received a charter of incorporation from the town council; it stipulated that every man before he became a freeman and master of the craft should submit to an examination in the following points: "Thatt he knaw anotomea, nature and complexioun of every member, in manis bodie. And in lykewayes he knaw all the vaynis of the samyn thatt he may mak flewbothomea in dew time. And als that he knaw in quhilk member the signe hes domination for the tyme." A noteworthy concession by the town council, as indicating the beginning of public teaching, was the grant to the guild "that we may have anis in the yeir one condampnit man after he be deid to make antomea of quhairthrow we may haif experience ilk ane to instruct utheris."

Among the native Edinburgh surgeons mention was made of Anthone Brisset, who treated Queen Mary of Guise (1542); Gilbert Skene, who published a treatise on plague (1568); John Chisholm, who operated on the Regent Earl of Morton for strangulated hernia (1572); and Gilbert Primrose, chirurgion to James VI and Deacon of the Craft of Chirurgeons (1583). A museum was gradually formed in the College of Surgeons, and Monro presented a skeleton (still preserved). Specimens of normal and pathological anatomy gradually accumulated, and in the eighteenth century Barclay commenced his valuable collection of pathological and comparative anatomy, which on his death became the property of the College. In 1831 the University separated the Chair of Surgery from that of Anatomy, thus producing a necessary change in the scope of the anatomy lectures. In 1831 anatomical instruction entered upon the modern epoch in Edinburgh.

Forgotten Teachers at Salerno.

Dr. CAPPARONI related how he had found in a manuscript belonging to the Cathedral of St. Mathew of Salerno many names of medical men unknown to Salvatore de Renzi when he wrote the history of the medical school. The manuscript contained a list, extending from the beginning of the second half of the eleventh century down to the sixteenth century, of the names of members of the brotherhood of St. Michael who died at Salerno. Some names and dates earlier than the eleventh century had been copied into the manuscript from the records of the Benedictines. The new names numbered altogether forty-five, but with regard to fourteen it was uncertain whether they were doctors. He had obtained fresh information with regard to the lives of thirty-six doctors mentioned by de Renzi, and was able to give those of sixty-three followers—English, Scottish, French, and German—who had visited Salerno. Most of the men whose names were given were monks or other clerics. When the practice of medicine outside the cloisters was forbidden, enthusiastic lay medical practitioners increased and guilds of medical men were formed. In his opinion the famous "women of Salerno" were chiefly midwives.

Inoculation for Small-pox.

Dr. TORKOMIAN said that those interested in the history of inoculation for small-pox were unanimous in declaring that the practice had been known from time immemorial in China; from that country it was introduced into Persia, Circassia, and Georgia, but they omitted to mention Armenia, situated on the borders of the countries mentioned and in constant relations with them. Armenia had, however, the right to be considered one of the countries which propagated the practice. The method consisted in gathering the scabs of the variolous pustules at the moment of desquamation and preserving them in the pulp of raisins. At first this mixture was swallowed, but later the method of inoculation by incision or rubbing

was practised. He concluded his speech with a tribute to Jenner, whom he calls one of the greatest benefactors of humanity.

Byzantine Cookery.

Professor E. JEANSELME and Dr. L. DECONOMOS contributed a paper on Byzantine food and culinary recipes. The Byzantines, they stated, preferred ground and winged game, and made large use of sea fish and of shell fish. Their culinary methods were complicated. They inherited from the ancient Greeks and the Romans a taste for sauces and highly seasoned dishes, and they drank wines mixed with various ingredients, such as honey, pepper, cumin, cinnamon, and myrrh, and as a people they were far from healthy, and their diet predisposed them to congestion and gout. Great numbers fell victims to these diseases, both in Constantinople and in the principal towns of the Greek empire.

Veterinary Medicine.

Major-General Sir F. SMITH, who contributed a paper on the position of veterinary anatomy in England during the sixteenth, seventeenth, and eighteenth centuries, said that the veterinary knowledge in England during the sixteenth and eighteenth centuries was very small, but considering that anatomy was only beginning to be taught in the fifteenth century, and that no veterinary schools were formed until the eighteenth century, this was not surprising. In the middle of the sixteenth century Thomas Blundell published a book on the study of diseases of horses, but the information it contained was for the most part traditional and often absurd. An Italian, Ferraro, of the Neapolitan school of horsemanship, wrote a work on the diseases of horses, which contained two anatomical plates which showed a great lack of knowledge of anatomy. The father of veterinary anatomy was the Italian Ruini, whose anatomical diagrams showed that at least he really studied the subject, and had some conception of the circulation. France and Italy had led in veterinary knowledge, but in this country there appeared to be a national indifference to precise knowledge of the subject.

Professor COLE considered that Carlo Ruini was the father of veterinary science. He was born in Italy in 1530, and became a senator of Bologna. In 1598 he published the first real book on veterinary science and the infirmities of the horse. His diagrams showed that he was the first who really knew anything about the anatomy of the horse. His work went through four editions in Paris, was published in London in 1669, and was often plagiarized. M. LEON MOULE said that Greek and Latin writers had confused several serious diseases of horses with glanders. "Malleus aridus" corresponded to acute glanders, and "malleus humidus" to chronic glanders, but "malleus articularis" was a rheumatic affection, and the "malleus elephantiasis" resembled the elephantiasis of the Arabs. Mr. H. J. SEVILLA said that there was reliable evidence that the Greeks had a very good knowledge of diseases of the horse and of veterinary surgery.

MATERNAL MORTALITY IN DUBLIN AND NEW ZEALAND.

DR. HENRY JELLETT, whose name is honourably bound up with the Dublin school of obstetrics, read a paper this year (1922) at the Annual Conference of the British Medical Association, New Zealand Branch, on the subject of maternal mortality in connexion with child-bearing. His residence in New Zealand enabled him to compare practice in that country and in Dublin. His experience in New Zealand had led him to form certain opinions; one was that the general maternal mortality in New Zealand was somewhat excessive, allowing for all deductions. Others were that the percentage of labours in which the child was delivered artificially was many times greater than was necessary for purely obstetrical reasons, and that the percentage of cases in which there was interference with the physiological mechanism of the third stage of labour was also very high. In his opinion the maternity homes were usually unsuitable in construction and equipment. He noted also that gynaecological and obstetrical operations of every degree of gravity were done by the general practitioner, not merely where expert assistance was lacking but even where it was available.

Dr. Jellett discussed each of these opinions in turn and suggested remedies. He had been furnished with figures by the Board of Health from which it was apparent that the maternal mortality for 1920 was 1 in 154 births, and he had specially scrutinized the worst districts—that is to say, those in which the rate was above the average and those (16 in number) in which it was more than 1 in 100. In the last-named group 6,876 births were attended by 89 deaths (1 in 77). He analysed the causes of death, and found that 74 per cent. of the total were due to four conditions—namely, sepsis, eclampsia, *post-partum* haemorrhage, and placenta praevia. He instituted the following comparison in regard to these four causes between New Zealand and Dublin (Rotunda) for the past twenty-six years.

Causes.	Mortality Rate.	
	New Zealand (30,761 births).	Rotunda Hospital (44,381 births).
Sepsis	1 in 459	1 in 634
Eclampsia	1 in 831	1 in 1,168
Post-partum haemorrhage ...	1 in 1,051	1 in 7,397
Placenta praevia...	1 in 2,796	1 in 7,397

Dr. Jellett was of opinion that the large number of *post-partum* haemorrhages pointed to the excessive frequency of instrumental deliveries and hurried third stages; the high death rate in eclampsia suggested either a severer type of disease or unsuitable treatment, probably the latter (Caesarean section done too often); and the mortality from placenta praevia also suggested unsuitable treatment (forced delivery, etc.). His explanation for the high death rate from sepsis was threefold—namely, increased virulence and prevalence of septic organisms (a matter of conjecture), operative midwifery, and unsuitable surroundings. By unnecessary operative midwifery he meant prophylactic *ante-* or *post-partum* douching, excessive vaginal examinations, unnecessary forceps applications, and interference with the course of the normal third stage. Private houses adapted to the purposes of a maternity hospital and too small to pay for proper equipment and service constituted unsuitable surroundings. Other causes of the septic mortality were criminal abortion (practically absent in Ireland) and venereal infection. Immature gynaecology, by producing pelvic infection, caused another kind of mortality—namely, sterility.

Dr. Jellett suggested the following remedies for the diminution of a maternal mortality and a functional mortality which seemed to be excessive in New Zealand. He would alter the relations between the medical attendant and the patient in cases of normal labour. The present relation, as he understood it, was that the medical attendant was expected to be available or even present during a great part of the labour, to shorten the procedure so far as possible, and to be content with an inadequate fee. All cases did not need skilled attendance by medical men all the time; they were better employed in supervising pregnant women and in picking out the cases in which trouble was likely to occur in labour. "There was clearly a large field for ante-natal clinics, provided those who conducted them knew what to look for." In this conclusion it is interesting to note that Dr. Jellett was in agreement with the strong expression of opinion at the recent Glasgow meeting of the British Medical Association (in connexion with the discussions on stillbirths, on eclampsia, and on infantile mortality in connexion with alcoholism), in favour of adequate ante-natal supervision and (when necessary) treatment.

Dr. Jellett advised the erection of midwifery blocks for paying patients in connexion with the large general hospitals, and would abolish all homes which were too small to be run both efficiently and profitably, insisting on the careful examination of all existing homes and hospitals. He would like to see the teaching of obstetrics made far more practical, and urged the provision of post-graduate teaching so that the training of specialists would be possible. Dr. Jellett also expressed the belief that there was a place for obstetrical and gynaecological specialists in large centres, and pleaded for their recognition by the general practitioner. His conclusion is worthy of quotation: "Labour under normal conditions is a physiological process; we cannot interfere with it without making it a pathological process and introducing complications whose possibilities for harm are infinite; therefore the wise and skilful obstetrician avoids interference."

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HOSPITAL POLICY.

THE very long and important discussion on hospital policy during the Annual Representative Meeting of the British Medical Association held lately in Glasgow has been fully reported in the SUPPLEMENT of July 29th (p. 52 and p. 60) and of August 5th (p. 71). The foundations of the debate were the Council's special report on this matter printed in the SUPPLEMENT of February 25th, 1922, and the relevant sections of the Annual and Supplementary Reports of Council published in the SUPPLEMENTS of May 6th and June 24th, 1922. Other stages in the process of collecting professional opinion were the Conferences of hospital staffs called by the British Medical Association in 1920, and again on March 22nd, 1922. We might mention also the discussion on hospital policy from a number of representative points of view in our two first issues of March last. It was claimed for the Council's special report on hospital affairs and the organization of voluntary hospitals that it pieced together a great number of scattered fragments of policy. Its main features were: (1) A general statement on the present-day purpose of the voluntary hospitals, with a definition of the voluntary principle; (2) a statement of the types of patients admissible for hospital benefit, particularly through contributory schemes; and (3) a sketch of the reaction of the new conditions upon the honorary medical staffs. This report was considered by the Divisions of the Association up and down the country, and the task of the Representative Body was to hammer out something that could be put forward as a working policy.

The report and recommendations of the Council were in the main accepted by the requisite two-thirds majority of the Representative Body. But this agreement was not reached without opposition. One important recommendation was taken back for further consideration, and the policy was finally adopted subject to certain definitions and limitations as to the method of its application. The modifications thus introduced are of sufficient moment to require close consideration. In estimating the value and the practical effect of the decisions taken, it is convenient to distinguish three aspects of the special report. In the first place, it may be looked upon as a summary of historical development. As such it met with general approval, and this in itself is no small gain. The facts must be common ground before agreement is reached as to interpretation and action, and it was one of the objects of the report to present a coherent account of widely differing conditions and experience. The reception given to the report in this respect shows that this aim has been attained.

The report next offered an interpretation of facts, whether in a narrower sense by the definition of terms, or in a wider by the analysis of social and economic tendencies, and their probable effect on professional development. Here more definite opposition might have been looked for, and did, in fact, arise, since divergence of experience is necessarily reflected in divergence of sentiment, and interpretation of facts must be more controversial than their record. Even here, apart from verbal amendments aiming at greater accuracy of definition, the report was accepted in its entirety, both as regards definition (notably the definition of the voluntary system and the classification of patients) and as regards the more far-reaching analysis contained in the preamble and the section on contributory schemes. Here two points of interest emerge: first, that opposition was directed rather to restatement of old policy (as in the case of private patients in voluntary hospitals) than to the enunciation of totally new policy (as in the case of contributory schemes); second, that the field of opposition had been narrowed, as was shown in the discussion on the classification of patients. Both these features of the debate might have been anticipated; for, on the one hand, it is around matters of less recent growth that a definite body of sentiment, based on experience, has arisen; and, on the other, it is only where the old and new systems meet and clash that acute controversy arises. The discussion on the sections dealing with tariff patients showed that even here, by closer definition, it might be possible to keep the controversy within still narrower limits; but it was not altogether clear that such a course would be advantageous at the moment. The final decision to accept the debated section, subject to the interpretation imposed by the withdrawal of paragraphs 33 and 35 (on the formation of staff funds), and the taking back of last year's policy in this respect for reconsideration, if it does not ensure an advance, at least entails no retreat from an established position.

Looking back over the course of the discussions we detect a feeling among the majority that the report offered a plan of action based upon the analysis and interpretation of facts. This plan has been accepted, not, indeed, in its entirety, and not without very definite opposition, but in such a way as to allow of practical development during the coming year. Interest here centres, on the one hand, in the recommendations about the staff fund (paragraphs 33 to 35 of the report), their withdrawal, the various amendments proposed, and the final instruction for further consideration; on the other hand, it rests in the definition and limitation of procedure during the coming year adopted by the Representative Body in approving the report as amended. A critical moment in the long debate was when paragraph 33 of the report was rejected in favour of Dr. Brackenbury's amendment, which excludes from assessment for the staff fund all contributions by or in respect of a patient where these do not exceed the full cost of maintenance and are not derived from State or rate aid. The original report suggested no such limitation, but had proposed that a percentage of all payments made by or on behalf of patients, from whatever source derived, should be passed into a fund which should be at the disposal of the honorary medical staff of the hospital. Now, the Council's recommendation on this point was a logical development of last year's resolution on the same subject—a resolution accepted in its original form by a narrow majority of the Conference of London hospital staffs convened by the Association in 1920, and in the revised form by a far greater majority of the Conference of hospital staffs of England and Wales in March of this year. At first glance, its rejection might seem to mark a retreat from an established position. Closer study, however, shows the decision rather as a recognition of the obstacles in the way of practical application, and the form of the reference back leaves the Council free to search out all paths to a more satisfactory solution of this very difficult problem. Meanwhile, the acceptance of the section on tariff patients in general—adopted with the interpretation needed to bring it into line with the staff fund decision—will, it may be hoped, suffice to meet possible developments.

The final resolution "That the carrying out of the hospital policy of the Association, as now approved, be proceeded with in stages; that during the ensuing session 1922–23, the education of the public in general, the hospital governors in particular, and the profession, be undertaken, and that progress be reported to the A.R.M.,

1923," is the measure of the advance made. The hospital policy of the British Medical Association has emerged as a coherent whole, definite enough to cope with the pressing difficulties of the moment, and flexible enough to respond to changing conditions. In the nature of things, its application, like that of certain Acts and Orders, must at first be permissive rather than compulsory, and the "appointed day," as the Chairman of Council has wisely said, is not yet specified.

In the present state of medical opinion the resolutions of a recent conference of the honorary staffs of London hospitals, published during the course of the Glasgow meeting,[1] are of much significance. While neither so comprehensive nor so explicit as the general policy accepted by the Representative Body at Glasgow, they do not, so far as we can see, conflict with it. They show, in the first place, recognition of changing circumstances. Thus the first resolution, excluding from assessment to the staff fund contributions not exceeding the cost of maintenance, is conditioned by the phrase "under present circumstances." Again, the succeeding resolutions mark the acceptance, not merely of the principle of payment of the honorary medical staff where a State-aided or rate-aided contribution is made, but also that of adequate remuneration for treatment at special clinics of patients for whom public authorities undertake responsibility. Whilst the second and third resolutions were not unanimous, they indicate movement along the lines followed in the development of the Association's policy.

THE POET LAUREATE ON THE LANGUAGE OF ANATOMY.

Just what is happening on the pavements of London streets to-day was enacted in the dissecting and examination rooms of Britain some fifteen years ago. "Keep to the right" had grown up to be a rule on London pavements until a self-elected body bounced the public and ordered it to "walk on the left." The result has been and will be confusion until the public decides whether the "right" or the "left" has it. Fifteen years ago English-speaking anatomists had reached a common system of names for the parts and structures of the human body; it was the accepted rule to use words borrowed from Latin and Greek as if they had become English words. In the hospital wards and in examination rooms the teacher and taught understood each other; at least, if they did not, it was not because of any discrepancy in the use of anatomical names. This happy state continued until the ill-starred Basle nomenclature was introduced. Then a confusion broke on the heads of medical students worse in its penalties than that which overtook the builders of Babel. The student could no longer speak in an English way of the "internal cutaneous nerve of the forearm," but must call it by its Basle name, *nervus cutaneus antibrachii medialis*. The new terminology, to be sure, gave the student certain advantages: he could, so far as his terminology was concerned, face examiners in Berlin, Basle, Rome, or New York—but not Paris. Also, when he was duly qualified, and had settled to practice, if he made researches then he could publish them in anatomical terms which could be understood in every country where the Basle nomenclature had come into use. At least, this was the belief which English-speaking friends of the Basle nomenclature urged on its behalf. These advantages, we fear, did not make a very strong appeal to the student.

The attempt to force the Basle nomenclature on the schools of Britain has given rise to controversy and to much learned discussion. It has been left to our Poet Laureate and Dr. Cuthbert Morton to bring the whole matter to a reasonable judgement. The pamphlet just published,[1] written in the easy clear style which makes one love our mother tongue, gives the English-speaking anatomist guidance to the right way out of the present dilemma. We must give the final opinion of our authors in their own words—it is necessary to use "authors," for it is somewhat difficult to tell exactly where the Poet Laureate leaves off and Dr. Morton begins in the pages of the pamphlet.

"It will be seen that the import of this disquisition is to condemn the action of those who are moving to introduce a *formal Latin international terminology* into the British schools of anatomy, on the false notion that it will be of service to international science. It is argued by us that such action is wrong in principle and harmful in practice, and that it cannot secure the advantages claimed for it. We contend that all scientific nomenclature must have its basis in every national language, and that whatever classical or foreign terms are introduced should be as far as possible adapted to the national speech. It is not denied that the work done by the German Committee (B.N.A.) may be of great service. Any combined effort of experts to fix the names of objects that have been variously, confusedly or awkwardly named is a first step towards the simplification and unification of nomenclature; and that is on all hands desired. But those who did this good work never themselves imagined that their attempt was final and in all details satisfactory, and while it should be fully considered and respected, it should be left to the common sense of the workers to take or refuse any suggestion on its own merits. In any case, common sense and convenience will in the end have their own way."

The Poet Laureate has never done medicine a better service than when he added his great influence and experience to the gallant and persistent efforts which Dr. Cuthbert Morton has made to bring order out of the terminological chaos into which British anatomy has been plunged. We should give an altogether misleading impression to our readers if we led them to think this pamphlet is merely for that small section of medical men who are professional anatomists. The authors have explained the principles on which the growth and evolution of the English tongue are based, and what they write of anatomy is applicable to every section of medicine. The "Language of Anatomy" is a pamphlet which every thinking medical man, whether he be reader or writer or both, will study not only with profit but also with pleasure. We sincerely trust it may find its way into every anatomical and clinical laboratory of the United States of America, in Canada, and in Australia, for the case for an idiomatic terminology has never been so justly or so explicitly stated as it has been now by Drs. Bridges and Morton.

ANNUAL MEETING NOTES.

The Pathological Museum.

The organization of the Museum Section reflected great credit on Professor J. H. Teacher and Dr. G. Haswell Wilson, who were responsible for the arrangements, and probably never before has one seen at the Annual Meeting such a large and representative collection illustrating all departments of medicine. Out of these exhibits of jar specimens, microscopic slides, photographs, drawings, casts, etc., it is difficult to select those for special mention, as the level of excellence was so high, but we may note some that attracted the most general attention. Of historic interest there were the old anatomical and pathological specimens of William Hunter recently arranged by Professor Bryce, especially those illustrating the anatomy of the joints, lymphatic system, gravid uterus,

[1] British Medical Journal, July 29th, p. 181.

[1] *S.P.E. Tract No. IX. The Language of Anatomy.* By William Cuthbert Morton, C.B.E., M.A., M.D. Edited with an introduction by Robert Bridges, M.B., F.R.C.P. Oxford: Clarendon Press. 1922. (Med. 8vo, pp. 27. 2s. 6d. net.)

and diseases of bones, now irreplaceable. The request of the organizers for specimens showing the influence of irritants in the production of tumours was well responded to by Dr. Alexander Scott of Broxburn, who showed photographs of the stages of development of epithelioma in paraffin workers under his care, by the lifelike wax models of irritation epitheliomata shown by Dr. Norman Walker, by the microscopic sections of Dr. R. D. Passey of experimental soot cancer, and particularly by the splendid collection from the London Cancer Hospital Research Institute. In the last case Dr. Archibald Leitch, the director, showed macroscopic and microscopic specimens of his successful experiments in the production of epithelioma, sarcoma, and papilloma by means of shale paraffin and coal tar, metastasizing epithelioma which he and Dr. Kennaway had produced by weak arsenical solutions, as well as various human tumours of theoretical and practical interest—notably a record case of late recurrence of breast cancer (twenty-three years). Mr. Cecil Rowntree, of the same laboratory, exhibited macroscopic and histological preparations of practically all the cases of *x*-ray cancer known to have occurred in England. To illustrate the discussion on animal and vegetable pathology Professor Gaiger, from the veterinary side, and Messrs. Howells, Robinson, and Walkden from the botanical side, exhibited most interesting specimens of animal and vegetable diseases, especially tumour formations. Specimens of eosinophilia and splenomegaly (Professor S. McDonald and Dr. Bernard Shaw), and chronic interstitial nephritis (Professor J. Shaw Dunn) illustrated two of the important contributions to the last meeting of the Pathological Section. Professor Robert Muir showed what is probably a unique collection of specimens of diseases of the liver, and Dr. G. Haswell Wilson demonstrated embryonic tumours of the kidney and several neuroblastomas. Dermatological, gynaecological, otological, radiological, and surgical specimens were well represented, and special mention should be made of the exhibit from the Research Department of the Glasgow Maternity Hospital, illustrating ante-natal and neo-natal pathology. One could have spent, and many did spend, several hours in the profitable study of the museum specimens.

THE POPULAR LECTURE.

The Popular Lecture was delivered to a very large audience in the Lyric Theatre, Glasgow, on July 28th. Professor J. Graham Kerr, M.A., F.R.S., took for his subject, "The Physician: Naturalist, Teacher, Benefactor," and although there were no lantern views or any other of the usual concomitants of a popular lecture, the interest of the subject-matter and the charm of the lecturer's delivery were such that the audience would gladly have heard more. The lecture is printed in full at page 241. The President of the Association took the chair, and at the close called upon Sir Archibald Garrod to propose a vote of thanks.

Sir Archibald Garrod remarked that the picture of the physician which had been held up that evening would not, he thought, result in any swelling of the head on the part of the medical men who were present. Rather it would humble them, and they would go away thinking that the picture represented them not as they were, but as they would wish to be. In recent times they had learned to clothe science with terrible garments, and had wondered into what new dreadfulness science was going to lead the world. But that was not science, it was the abuse of science. Science herself was not dreadful; it was not even dry. There was in science a great region of fairyland, and the keys which opened the gates to that region were entrusted to a select few. Those who most frequently held the keys were, he thought, the astronomers and the naturalists. Darwin held such a key, and so did Tyndall, and Faraday, and, to come nearer to this generation, Robert Ball. But there were not many, and the key was a very choice possession. Evidently the lecturer of that evening held such a key, and he had opened up some fields much more wonderful than any fields of fancy. Professor Graham Kerr's remarks on the mosquito were most interesting. It was good for people to be taken away for a time from the strictly human point of view, for, after all, the mosquito or the bacterium could claim that the world was made for it just as much as for a human being. All these forms of life had their own interests, which they did their best to further. The tubercle bacillus had its way to make in the world, and men were always thwarting it, entertaining, apparently, strong prejudices against it, chiefly because it had the unhappy taste to thrive upon the people we could least spare—John Keats or R. L. Stevenson. Professor Graham Kerr had done them all good service by furnishing a new angle from which to view the world of nature and of men.

Sir William Macewen, before putting the vote of thanks to the meeting, said how greatly interested he had been in the lecturer's allusion to Metchnikoff's work on phagocytosis. The same process was made use of in surgery. Stitches were put in every day, and also certain kinds of drainage tubes, which, after serving their immediate purpose, were taken up by the phagocytes and carried away so far as they were not wanted. The husband of one of his patients complained to him that he was not very comfortable about his wife because more active measures were not taken to heal the operation wound. His reply was, "God does the healing, and we look on." That did not satisfy the gentleman, and he said that surely the stitches must be taken out, or at any rate the drainage tube. Sir William then asked him whether, when he was a boy, he had ever planted things in the soil, and, if so, whether he took them up every day to look at them. As for the stitches, his good lady would "eat them all up," and as for the drainage tube, since this was a chicken-bone drainage tube, the tissues would be trusted to deal with that also. The useful phagocytes would do their work, and at the end of a couple of weeks there would be nothing to be seen. Therefore, phagocytic action was of the greatest importance in surgery in taking away material that was no longer wanted.

Professor Graham Kerr, in responding to the vote of thanks, said that he felt greatly honoured by the presence of the President in the chair, for Sir William Macewen was the embodiment of the naturalist, the teacher, and the benefactor. Those who had visited Sir William's home in Bute or had gone into his laboratory knew him to be a naturalist through and through. He was also the teacher, keenly interested in the technique of teaching; about his teaching gifts his old students had a great deal to say. Finally, he was an example of the benefactor. "Uneasy lies the head that wears a crown," but those who followed the enthralling story of brain surgery in his Presidential Address must have felt that there were other crowns than material ones, the wearing of which did not make the head uneasy, but rather ministered to its repose.

RECEPTION AND DANCE BY THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The last of the big social functions was held on Friday evening, July 28th, when the President and Fellows of the Royal Faculty held a reception and dance in the McLellan Galleries. This beautiful suite was filled with a gay and happy company of over five hundred, who were received by the President (Dr. W. G. Dun), the Visitor (Dr. W. R. Jack), and the Treasurer (Dr. MacDonald). Dr. Dun welcomed the members of the British Medical Association as the guests of the ancient and Royal Faculty. The arrangements were in the efficient hands of Mr. Walter Hurst, who had provided a short musical programme of songs by Miss King, Dr. T. D. Laird, and Dr. A. N. McLellan, to fill the interval pleasantly.

HOME AMBULANCE SERVICE.

THE Joint Council of the British Red Cross Society and Order of St. John has issued a new edition of the list of home ambulance stations, organized by its Home Service Ambulance Committee. The aim is to distribute ambulances on such a scale that wherever illness or accident may occur there shall be a motor ambulance within a convenient distance to carry the patient with a minimum of disturbance and pain to the

point where medical and surgical skill can be most efficiently applied. The scheme is arranged on a county basis, and the list, which follows this arrangement, shows the places in which ambulances are stationed and the officer in charge at each place. The total number of ambulances in service on March 31st last was 309. The total number of patients carried during the year was 53,743. Not only is the number of persons carried increasing, but also the number carried by each ambulance; the average was approximately 133 in 1920-21, and 178 in 1921-22. The committee concludes that as the service becomes better known to medical men they are resorting to it more often for the benefit of their patients. In some instances patients have been moved long distances, as for instance from Plymouth to co. Tyrone, by ambulance. In other cases the patient has done the greater part of the journey by rail, but has been carried to the train and from the train by an ambulance. The method adopted in the matter of charges for the use of ambulances varies in accordance with local circumstances, and it is left within the discretion of the county representatives. In many cases the ambulances are maintained by voluntary weekly subscriptions from workmen, and no charge is made for their use. In other instances the costs are defrayed by institutions or by local subscriptions, but generally a charge is made and special allowances granted for necessitous cases. The lower cost of petrol and repairs, and especially the replacement of the heavy ambulances by lighter vehicles, have made possible a very general reduction of charges throughout the country during the year. The accounts received show that, in a well-organized county it is possible to maintain all the ambulances without making any call for subscriptions, or on county funds. The committee has gained much experience in ambulance work and is always ready to advise any organization which is proposing to do work of this nature. At the request of the Queen of Spain the committee undertook last year to supervise the building of four ambulances for the Spanish army; these were delivered at Christmas and gave complete satisfaction. The Government of Fiji also has adopted the plans and specifications in use for the committee's ambulances. Major E. W. Paget, C.B.E., acts as liaison and inspecting officer for the committee. Any medical man who wants an ambulance for the removal of a patient should apply to the officer in charge of the nearest station; if he has not got this information it can be obtained from the County Director. Application for ambulances for the transport of patients in the London area may be made to Mr. F. C. Davies, O.B.E., Secretary of the Home Service Ambulance Committee, 19, Berkeley Street, London, W.1. A branch of the ambulance work that has made steady progress in the country is that of carrying parties of children from outlying villages to clinics in neighbouring towns. The work, which has been carried out under the direction of the school medical officers, though rather outside the original scope of the committee, is fraught with so much advantage to the health and welfare of the children that the officers in charge of the ambulances have gladly undertaken it.

CHOLECYSTECTOMY OR CHOLECYSTOTOMY.

REMOVAL of the gall bladder has now become the operation of choice, in preference to cholecystotomy and drainage, in disease of the gall bladder, on account of the benefit that results from removal of a faecal infection, of the diminished liability to recurrence of symptoms, to the further formation of calculi, and to primary carcinoma of the gall bladder. By analysis of his own cases Mr. James Sherren[1] has recently shown the superiority of cholecystectomy to cholecystotomy; thus among 184 cases of cholecystectomy carried out in the treatment of calculi confined to the gall bladder and operated upon more than three years ago there were 6 deaths, but no recurrence of symptoms; whereas among 152 cases of cholecystotomy during the same period there were 4 deaths, and among the 148 survivors 34 recurrences. He points out that it is the diseased gall bladder and not its products, whether infected bile or gall stones, that should be treated, and insists that drainage does not cure chronic cholecystitis. Cholecystectomy should therefore, he considers, be the treatment in all surgical diseases of the gall bladder, as a primary procedure where possible, or, when the risk to life is great, in two stages. The question might be raised whether in a physiological sense removal of the gall bladder is detrimental; in other words, has the gall bladder any functions other than the storage and concentration of bile and the addition to it of mucus? It is possible, as suggested by Rost, that while in the gall bladder the bile acquires some properties valuable in intestinal digestion, which the liver bile does not possess; the dilute state of the liver bile as compared with the gall-bladder bile renders this a reasonable possibility, but there is no proof thereof. From a practical point of view it is to be borne in mind that a diseased gall bladder fails to concentrate the bile or to add mucus to it, and it therefore appears that arguments applicable to a healthy gall bladder do not hold good as regards one in a pathological condition. Mr. Sherren does not attempt to go into those theories with regard to the function of the gall bladder and the changes inimical to the well-being of the patient that may result from its removal, but clinical experience has convinced him that cholecystectomy is safer for the patient, that the risk of recurrence is negligible, and that the loss of the gall bladder in no way interferes with well-being.

[1] J. Sherren, *Brit. Journ. Surg.*, 1922, x, 135–137.

THE STUDY OF VENEREAL DISEASES.

THE newly formed Society for the Study of Venereal Diseases held its first general meeting in London on July 31st under the presidency of Dr. David Watson of Glasgow. It was announced that the society has 117 members, but the hope was expressed that this number would shortly be increased, as there are over 200 clinics, with between 300 and 400 clinicians, administrators, and pathologists attached to them. Dr. Watson, who was unanimously elected to the chair on the proposition of Mr. F. S. Kidd, said that whatever objections there might be to the recognition of venereal disease as a special branch of medical practice, facts had got ahead of arguments. It might seem that to group under the heading "venereal" such diseases as syphilis, chancroid, and gonorrhoea, which differed so greatly in their manifestations and ultimate effects, was an unscientific method of classifying disease; but they were properly linked together, because the infections were mainly produced by venereal contact, and, what was more important from this point of view, they were amenable to similar methods of prevention and control by health authorities. Whatever might happen in the future, the acceptance of these diseases as a specialty was necessary under present conditions. The decree of the General Medical Council that medical students must receive a course of instruction in venereal diseases established the subject as a specialty. Sir William Macewen, in his Presidential Address to the British Medical Association, had stated with regard to syphilis that now that the Government and the laity had been educated by the medical profession to the fact that syphilis was a preventable germ disease and could be stamped out by known means, this generation, if it did not stop the disease, would commit a crime against posterity. Dr. Watson agreed with this statement, but added that gonorrhoea and chancroid should be placed in the same category. Everyone knew, however, that what Sir William Macewen demanded would not result in the present generation from the measures so far taken. The history of modern medicine proved that when a sufficient number of members of the profession became interested in a special branch of medicine it was a great advantage to bring them together for social intercourse, exchange of views and criticisms, and mutual stimulation of research. This was the aim of the new society; it would endeavour to obtain a correct perspective, and while encouraging minute attention to detail would not lose the

larger view. It would co-ordinate the administrator, the clinician, and the pathologist for the scientific study of the many problems that must be settled before the conquest of venereal disease could be announced. Colonel L. W. Harrison, who added a few words, said that diseases were mostly grouped together for convenience in management, but on account of its etiology and social importance venereal disease was worthy of a category to itself. In spite of current criticism of the venereal clinics he regarded them as a means of stopping the spread of the disease by rendering the greatest possible number of infective persons non-infective. The Presidents of the Royal Colleges of Physicians and of Surgeons, and of the Sections of Dermatology, Urology, and Obstetrics and Gynaecology of the Royal Society of Medicine were elected Vice-Presidents, together with Mr. Frank Kidd and Dr. Wilfrid Fox. Dr. E. R. T. Clarkson was elected honorary secretary, and Dr. Sydney G. Macdonald treasurer. It was agreed to hold six general meetings of the society during the year—on the last Fridays of November, January March, June, and July, and to hold the annual general meeting next year in London; the suggestion was made that in subsequent years the meeting should be held at the same time and place as the annual meeting of the British Medical Association. A further suggestion to form a local division for Scotland was referred to the Council.

BEER AND LEAD POISONING.

A FORTNIGHT ago we stated that we had received information of several cases of lead poisoning among men which it was considered were due to the drinking of beer. We are now able to state that during the last month a considerable number of cases of lead poisoning occurred in certain districts in the County of Middlesex which were traced to the consumption of beer supplied by a particular firm of brewers. A medical practitioner in one of the affected districts promptly recognized that an outbreak of lead poisoning was occurring amongst his patients and at once notified the medical officer of health. The latter found that the outbreak which was fairly widely spread in his district, was limited to persons resorting to certain public-houses in the cellars of which large iron tanks lined internally with white enamel had recently been provided for storing the beer. Samples of beer from these public-houses were taken for analysis and found to contain about one grain of lead per gallon. The beer as it left the brewery was found to be free from lead. It was ascertained that a lead glaze had been used in the preparation of the enamel, and that from this source, owing to the plumbo-solvent properties of its sugars, the beer became contaminated. The use of these tanks was at once discontinued by the brewery company, and risk of further danger from this source was arrested. The persons affected had drunk the beer containing lead for some two or three weeks before the cumulative effect of the poison produced the characteristic signs and symptoms. These included colic, constipation, jaundice, and a blue line on the gums. It is thought probable that cases of lead poisoning ascribed to unknown causes have occurred among persons who resided in other districts and frequented public-houses in which the contaminated beer was sold; but it is possible also that anomalous cases of illness which may have been instances of lead poisoning have been encountered by medical men in or near the districts in which the public-houses in question are situated. During the investigation it was found that another brewery company substituted tanks for barrels in their public-houses, but in this instance the tanks were of earthenware lined with leadless glaze, and no lead was found in samples of beer taken from them. The occurrence is a good illustration of the value of prompt action on the part of practitioners in reporting to the medical officer of health cases of illness which may be due to the contamination or infection of articles of food or drink. It is desirable that the medical officer of health should promptly inform the Ministry of Health of the occurrence of such cases. It sometimes happens that the same causes are operating simultaneously in widely separate districts, and it is only by co-ordination through the central authority that such occurrences can expeditiously be dealt with.

ROYAL SANITARY INSTITUTE CONGRESS.

THE thirty-third congress of the Royal Sanitary Institute, which was held at Bournemouth from July 24th to 29th, was attended by some 500 persons, including delegates from the British Dominions and Colonies and from many foreign countries, as well as by representatives of Government departments, county and town councils, and other public bodies. The president of the congress was Major-General J. E. B. Seely, M.P., who in his presidential address protested against economies at the expense of the public health, and said that the three very important principles which lay at the basis of the congress were, first, the vital necessity of the health of the people to the maintenance of the British Empire; second, that national health required the organization of all the various agencies; and third, that the health policy of the nation should not be merely the prevention of disease and premature death, but the increase in human capacity and happiness. Great advances had been made in the provision of cleaner towns, better sanitation, good water supplies, food control, drainage and sewerage, but not enough had been done for the education of the people in a healthy way of life. The housing problem could be solved only by steady and persistent work in every district over a number of years. Curtailment in the school medical service had been spoken of in the interests of economy, but he considered that that service was not only saving the lives of hundreds of children, but was laying the foundation for a healthy nation in years to come. Meetings for the reading and discussion of papers were held in five sections: Sanitary Science, Engineering and Architecture, Maternity and Child Welfare including School Hygiene, Personal and Domestic Hygiene, and Industrial Hygiene. In the Section of Sanitary Science a discussion was held on methods of securing continuous treatment of persons infected with venereal diseases, in which papers were read by Dr. J. Johnstone Jervis, Dr. W. E. Facey, Mr. Kenneth Walker, and Dr. Joseph Cates. In the Section of Maternity and Child Welfare including School Hygiene, papers were read by Dr. John Robertson on the regulation of the distribution of milk and food at maternity and child welfare centres, and by Dr. D. C. Kirkhope on certain preventive and curative aspects of the school medical service. Papers were also read on different aspects of maternity welfare by Mr. Aleck W. Bourne, Dr. R. Veitch Clark, and Dr. R. J. Maule Horne. In addition to the meetings of the sections, a number of conferences were held of sectional representatives, such as sanitary authorities, medical officers of health, engineers and surveyors, veterinary inspectors, sanitary inspectors, and health visitors. The popular lecture, on "The value of clean fresh air," was delivered by Professor Leonard Hill, F.R.S., who said that physiologists could help greatly to point the way to a happy and healthy life, but ignorance and custom enveloped the people, and it was problematical whether our civilization might not stifle itself like older civilizations and die out. The discipline and the laws of health, which included moral restraints, alone could save it.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

The Work of the Session.

THE adjournment of the parliamentary session on Friday, August 4th, until Tuesday, November 14th, marks the passage of most of the bills and other proposals to which the Government committed itself in the King's Speech on February 7th. Some comparatively small measures are left over, and the text of the Irish Constitution has to await consideration some time hence, for the simple reason that the Irish Provisional Government has not been in a position to translate itself into a parliamentary assembly to frame and pass it on that side. The two outstanding features of the session at Westminster were the enactment of a bill ratifying

the Irish Treaty, and the embodiment in the Finance Act (the corollary of the Budget) of many of the recommendations of the Geddes Committee, with such modifications as appeared necessary to maintain efficiency while making for economy. In that regard it has been recognized that health must be deemed a supreme asset of the nation, in so far as it can be promoted by the State, and so the "cuts" in the Department primarily concerned with it were not so ruthless as was feared at first. Amongst the minor legislative achievements were the passing of the Criminal Law Amendment Act, the Milk and Dairies Amendment Act, and the National Insurance Amending Act, the provisions of which were explained in these pages while progress was being made. In accordance with its undertaking the Government submitted in the Upper House a series of resolutions giving in outline a scheme for the reform of the House of Lords; but nothing was done in regard to them, nor was anything expected to be done in this connexion at present. It need hardly be added that the statute book, particularly this session, does not convey a correct idea of the value of the contributions by medical members to the debates. They have given valuable knowledge and highly useful suggestions to both Houses in this way, and also by inquiries at question time.

Estimates Committee.—In a general debate on August 1st, on the Report of the Estimates Committee, Sir Frederick Banbury (who was chairman of this independent body) referred to the salary of the chief medical officer of the Board of Education. He receives a salary of £2,500, partly borne on the Education Vote and partly on that of the Ministry of Health, this being an increase of £400 a year upon the salary paid last year. The Estimates Committee did not think that, in the circumstances, the increase was justified. Mr. Fisher, taking this up, said there was no more distinguished public servant than Sir George Newman, no one to whom the health of this country owed a greater debt. Every penny of the salary paid to him was returned to the country over and over again.

Pensions Administration.—A discussion arose on the work of the Ministry of Pensions. Mr. Kennedy said he had evidence that cases passed by medical boards as cases in which the disability was due to or aggravated by war service had been considered by the Ministry at headquarters and the decision of the medical authorities turned down. He quoted a memorandum of the Bristol War Pensions Committee which said that if a man allowed twelve months to elapse before making a claim the invariable conclusion was that the disability had been contracted since discharge, although the man had struggled through this time hoping that his health would improve. Mr. A. Hopkinson, on the other hand, thought that the reason why the Ministry of Pensions was criticized was that it was efficient, doing its duty without fear or favour. Sir A. Warren, speaking from a large knowledge of administrations throughout the country, said that there were scores of cases of men trying to impose themselves upon the funds of the country, but there were thousands of the other kind, and he urged that there should be more consideration. Mr. Duncan Graham said that the views of panel doctors were entitled to as much consideration as those of the ex-service doctors on boards. Major Tryon, replying on behalf of the department, said that fresh claims to pensions were being admitted at the rate of three hundred a week; of that number fifteen to twenty were cases of tuberculosis. Cases of tuberculosis were treated on specially favourable terms, because even when a man was discharged from hospital he got 100 per cent. for six months, although he was very much better, and 50 per cent. for two years, even though he might be well. The policy had been that there should be no economy at the expense of the pensions, but that it should be made and pushed to the utmost on the cost of administration. For the lower estimates of this year there were various reasons, such as children getting beyond the age and widows remarrying. About one-fourth of the widows had remarried. The new scheme of administrative areas, replacing the work of the old local committees, was estimated to afford a reduction in expenditure this year of £300,000. When as a result of enormous expenditure on the part of the State in the provision of skilled medical attendance and so on a man got better his pension was reduced, but nothing was said in public about the fact of his being better. Up to a short time ago the net reduction of assessments over the whole range of the medical board was only 5 per cent., and the last figure he had seen was a little less than that. Mr. Adamson, an ex-chairman of the Labour party, spoke of a feeling of dissatisfaction amongst ex-service men in regard to pensions, and quoted certain cases of apparent hardship which, he said, could be multiplied. He suggested that the Government should set up a national appeal board. The Attorney-General pointed out practical difficulties in the way of the establishment of a national appeal board, and the discussion drifted to the problem of finding work for ex-service men. In reply to a question on August 3rd, the Attorney-General said that entitlement and assessment tribunals in dealing with appeals were empowered in any case involving a difficult medical or surgical question to send the appellant to be examined by a specialist who should report to the tribunal, or to take the opinion of a specialist upon a case stated to him.

The Manufacture of Morphine.—Replying to Viscountess Astor, on August 2nd, the Home Secretary said that 643,985 oz. of morphine were made in England in 1920. No statistics of the amount used for home consumption were available. The Customs returns showed that 322,484 oz. of morphine and heroin were exported, but this did not include amounts exported by post or in the form of preparations. The manufacture of morphine could only be carried on under Home Office licence. Viscountess Astor inquired whether 95,000 lb. of special medical opium were sent by the Indian Government to the Secretary of the Revenue and Statistics Department, London. Sir J. Baird said that during the war Indian opium was imported into this country for the manufacture of morphine required by the army. It was sold to the manufacturers in this country. The balance of the stocks were reshipped to India early in 1920, and Indian opium was not at present being used by British morphine manufacturers.

National Health Insurance Expenditure.—At the instance of Mr. T. Thomson, Sir A. Mond, on August 3rd, gave the following particulars of National Health Insurance expenditure for the past two years:

	1920.	1921.
Total expenditure on benefits	£18,782,000 ...	£21,562,000
Total cost of administration	£4,500,000 ...	£4,927,000

Removal of Ex-Service Men from Asylums.—Mr. Macpherson has stated in a written reply that when a relative insisted on the discharge of a service patient from an asylum against the advice of the medical superintendent the relative was informed that should application be made for readmission of the patient to the asylum (which experience showed usually happened very shortly) the question of reclassifying the man as a service patient, and so entitling him to all the privileges of classification, must be considered afresh. This was a reasonable procedure; it was used with the greatest discretion, and solely in the interests of the patient's treatment and prospects of recovery; it in no way conflicted with the provisions of the Lunacy Act. The arrangement by which service patients were placed on the legal footing of private patients did not remove the Visitors' power of discharge, but it did confer additional powers of discharge by which the responsible relative of a service patient might direct discharge, unless the medical superintendent put in a barring certificate under Section 74 of the Lunacy Act.

Prison Administration.—Sir Thomas Bramsdon asked, on August 1st, whether, in view of the urgent need and insistent public demand for an inquiry into the prison system and the administration of His Majesty's prisons and Borstal institutions, the Home Secretary would consider the appointment of a thoroughly representative Royal Commission at an early date for this purpose. Mr. Shortt said the matter was under consideration, and he hoped to come to a decision shortly.

Leprosy in India.—Earl Winterton stated, on August 3rd, in answer to Sir C. Yate, that the amended Leper Act, passed by the Indian Legislative Council in 1920, empowered local governments to indicate places to be leper asylums, and the local areas from which lepers might be sent to such asylums. The treatment of lepers was a transferred subject dealt with in provincial administrations by a minister responsible to the Legislative Council of the Province. The Act was therefore not compulsory. It was in force throughout Bengal and in prescribed areas of Bombay and Burmah. Its application was under consideration by the Governments of the United Provinces—Bihar and Orissa and the Central Provinces. It had not been applied in Assam, the Punjab, or the Madras Presidency. The exact number of the lepers segregated under the Act were not available, but 918 were reported to be in asylums in Bengal and 368 in the Bombay Presidency. In Bengal treatment by chaulmoogra oil and its derivatives, in Bihar intravenous injections of hydrocarpate of sodium and sodium morrhuate had been found satisfactory. In Bihar treatment by antimony was being tried. Recent research tended to show that deficiency in certain essential constituents in diet (vitamins) might be a factor in causing leprosy.

Brief Notes.

Poison gas is manufactured for the War Office now only in such small quantities as are required for research and experiment. The cost was £8,000 a year apart from research and experiment or protection against gas attack.

Mr. Macpherson has stated that subject to overriding considerations of special qualifications and experience—specialist or other—preference is given by the Ministry of Pensions to medical practitioners who served in the war, but by far the greater number of medical men in the employ of the Ministry have had no connexion with army service other than their temporary service in the late war.

In answer to Sir Robert Newman, on August 2nd, Sir A. Mond said that so far as the Board of Control knew, there were fifty-eight county and borough mental hospitals which had no women members on the visiting committee. In these institutions there were approximately 31,000 female patients.

In answer to Mr. Kennedy, on August 2nd, Major Tryon said that during the three months—March, April, and May—the average number of disabled men in receipt of special diet allowances was about 6,700, and in June about 4,200. Of the former 85 per cent. and of the latter 95 per cent. were cases of tuberculosis.

The Minister of Health, in reply to a question, recalled a memorandum issued in 1919, which was to the effect that the practice of spraying halls and places of public resort with a disinfectant fluid was of doubtful utility, and tended only to create a false sense of security.

Sir A. Mond has stated that the total number of cases of scarlet fever reported in the first six months of 1922 was 54,966; in the corresponding period of 1921 it was 56,023. No increase was shown in the more recent returns, the figures remaining fairly constant at about 2,000 weekly. Notification of measles was not compulsory throughout England and Wales, and consequently no reliable figures could be given.

Scotland.

DEATH OF THE INVENTOR OF THE TELEPHONE.

THE death is announced of Dr. Alexander Graham Bell, who made the telephone a practical instrument which could be used both for receiving and transmitting messages. His father and grandfather were both authorities on phonetics and defective speech, and Graham Bell was himself led to his remarkable invention rather through his interest in physiology than through his knowledge of physics or electricity. He had an early link with the medical profession through his mother, who was the daughter of Dr. Samuel Symonds, surgeon in the navy. Dr. Alexander Graham Bell was born in Edinburgh in 1847, and was educated at the Royal High School and the University of Edinburgh; afterwards he went to University College, London, but while still a young man removed with his father to Canada, proceeding later to the United States, where he took the degree of M.D. and was appointed professor of vocal physiology at Boston. It was at Brantford, in Canada, in 1874, that the germ idea of his discovery began to grow, and he linked up his experiments in telegraphy with his study of the movements of the tympanic membrane and bones of the ear during the utterance of sound. He showed a speaking telephone at the Philadelphia Centenary Exhibition in 1876, but it was unnoticed until a chance previous acquaintanceship of Bell with Dom Pedro, Emperor of Brazil, who was visiting the exhibition, brought it to the notice of the judges. In 1877 the University of Heidelberg gave Bell the honorary degree of M.D., but this was probably awarded in recognition of his invention of the photophone and of a telephone probe for detecting bullets in the body rather than for the telephone. In later years he made many other inventions, including the graphophone and a submarine chaser capable of travelling under water at the rate of seventy miles an hour; the laws of flight and the education of the deaf also engaged his attention. In 1906 he received the honorary degree of LL.D. from the University of Edinburgh, in 1918 the Hughes Medal of the Royal Society was conferred upon him, and in 1920, as was recorded in our columns at the time (December 11th, 1920, p. 908), when on a visit to Scotland he was presented with the freedom of his native city.

SCOTTISH BOARD OF HEALTH.

Annual Report.[1]

The three hundred and sixty-five closely printed pages which constitute the Third Annual Report of the Scottish Board of Health (1921) give some idea of its manifold activities. It was not, however, a year of extensions in the work, because the need for economy has dominated all things. At the same time grave unemployment following upon acute trade depression has called for immediate measures, and these have been provided in the Poor Law Emergency Provisions (Scotland) Act and the National Health Insurance (Prolongation Insurance) Act, both of 1921. By means of these Acts provision of food for mothers, infants, and school children has been secured, and large numbers of unemployed have been saved from falling out of insurance. The Board, however, is apprehensive of the effect of the continued industrial distress on the health of the people; and in increased claims for sickness benefit sees signs of lowered vitality. On the other hand, it is encouraged by the steady decline in infant mortality and in deaths from tuberculosis, by the increasing attention which the medical profession generally is devoting to preventive medicine, and by the spread of a knowledge among the people of the elements of personal hygiene.

The report pays a tribute to the services of Dr. John C. McVail, one of the two medical members of the Board. He retired at the end of last year. The Board notes that "when the Scottish Insurance Commissioners were constituted under the National Insurance Act of 1911, Dr. McVail was selected as Medical Commissioner. At that date he had already achieved distinction as a general practitioner, as a county and burgh medical officer of health, and as a medical investigator, teacher, and author. . . . We take this occasion to record our high appreciation not merely of his services as a member of the Board, but also of the distinguished part he has played in promoting the development of public health administration in Great Britain." It will be fresh in the memory of the profession that Dr. McVail was honoured at the general meeting of the British Medical Association in Glasgow by the presentation of the Stewart Prize.

[1] Third Annual Report of the Scottish Board of Health, 1921. Presented to Parliament by Command of His Majesty. Edinburgh: Published by His Majesty's Stationery Office. 1922. (Cmd. 1697.) Pp. 365. Price 10s. net.

Scope of the Report.

A glance through the list of subjects dealt with shows the wide ground covered by the report. There are eight large divisions: (1) Public Health; (2) Housing and Town Planning; (3) National Health Insurance; (4) Poor Law; (5) Local Government; (6) Prevention and Relief of Distress; (7) Old Age Pensions and Pensions to Blind Persons; and (8) Miscellaneous. These are followed by valuable appendices (pp. 223–365), containing tables and the like, to which students of vital statistics will go for information, as, for instance, under infectious disease notification (p. 246) and infantile mortality (pp. 248–251). Some surprise entries are found. Thus under "Miscellaneous" there is reference to the religious revival in the North East of Scotland in the following terms, as a result of an investigation by the Board's chief inspector and one of the district medical officers: "The conclusion arrived at by these officers was to the effect that, apart from the risks accompanying the attendance at prolonged crowded meetings, which, during the more fervent phase of the movement, broke up at a very late hour, the influence of the revival may be a factor in improved mental and physical health; there is overwhelming evidence against the suggestions that it has been in any way responsible for attacks of insanity" (p. 221).

Public Health.

Perhaps the most interesting part of the report to the general practitioner is that dealing with public health, although that on the National Health Insurance will doubtless attract not a few. Public health activities appear under the headings of infectious diseases (from tuberculosis to enteric fever, and including the venereal diseases), sanitary administration (including the question of water supply owing to the long-continued drought, and that of the housing of seasonal workers), maternity and child welfare (now a large and progressive and life-saving business), nursing (dealing with progress under the Nurses' Registration (Scotland) Act of 1919), school health administration (restriction of expenditure), the Highlands and Islands (Medical Service) Fund (with interesting remarks on the attack of whooping-cough in St. Kilda), welfare of the blind (schemes and grants in aid), and inspection and supervision of food. Under tuberculosis the main consideration has been economy, and all projects for new institutional provision have either been abandoned or severely curtailed.

The venereal diseases returns show a small increase in the number of new cases (due rather to the opening of new centres than to any growth in the incidence of the disease), and a larger increase in the number of attendances (a matter for congratulation, as it indicates a growing readiness to continue treatment till medically discharged). A useful table on p. 245 gives a list of institutions approved as venereal diseases treatment centres. Of the total population of Scotland (4,882,288) 4,530,035, or nearly 93 per cent., are resident in areas that now have approved venereal diseases schemes. The good effect of this widespread provision of means of treatment ought soon to be evident. The Board, it is to be noted, is considering the matter of professional secrecy in connexion with these maladies; the question has arisen in England (vide the JOURNAL for June 18th, 1921, p. 904), but not yet in Scotland.

It is noted that encephalitis lethargica is compulsorily notifiable in England but not in Scotland, and the Board adduces the obscure nature of the disease, its low infectivity, and our present ignorance of any specific treatment in explanation of this difference of practice as between the two countries. Inquiry and report, however, by medical officers of health are invited.

Maternity and Child Welfare.

Under the heading of maternity and child welfare there is a distinct note of regret in the Board's comment on the restriction of public expenditure: "Restriction is doubly difficult in a service such as this, which has nowhere reached its full development." The regret is, of course, increased by the consideration of the good results already obtained. The infantile mortality for Scotland in 1921 was 90.3 per 1,000 live births, as against 92 in 1920, which was the lowest till then

recorded. Notice should be taken of the significant remark, "This figure excludes, of course, stillbirths and all ante-natal deaths"; it is good, therefore, in itself, but it is incomplete. It is to be hoped that through notification the stillbirths rate will soon be known and published. In the meantime the earlier ante-natal deaths can hardly be counted, and matters are scarcely ripe for an abortion rate. It is, however, a matter for the consideration of the Board whether the deaths in the first month of life should not be extracted and presented in the form of a new and separate rate. In the tables the deaths in the first week are stated, and those after the first week and under one month, but a neo-natal or primi-mensal rate put prominently forward under its own distinctive name would be of great value in estimating the health conditions in town and country. The neo-natal rate would probably be found to be the most sensitive index of general well-being in a community, especially if it were accompanied by a stillbirths rate.

The Board is concerned regarding the preventive treatment of ophthalmia neonatorum, and has issued a circular (Appendix iv, p. 231) regarding the treatment of the infant's eyes at birth with a solution of silver nitrate (1 per cent.). The Board ought not to forget that the true preventive treatment of this disease begins with the curing of the expectant mother's gonorrhoea.

Conclusion.

The report forms a remarkable record of health activities; and whilst the reader is led rather abruptly from the largest to the most trifling matters, his interest is never allowed to flag, and that is high praise of a more or less statistical work. The question of the Drug Fund under Medical Benefit is a big matter, whilst the proposed cinematographic installation in a Poor Law hospital (fireproof chamber needed for entertainments to the children) is a very small one; but each is dealt with intelligently and no doubt wisely by the Board. The fireproof chamber, it may be noted, was not forthcoming. The report, as a whole, is one upon which the Board may justly congratulate itself and receive congratulations.

England and Wales.

METHODS OF HOSPITAL ACCOUNTING.

THE Voluntary Hospitals Commission has under consideration the form of account to be recommended to local hospital committees in order to secure uniformity and so facilitate comparison of the real cost of maintenance of hospitals. In a pamphlet recently issued the Commission makes two recommendations: (1) Hospitals which can do so are advised to use the "Revised Uniform System" and no other though it have a similar name; (2) cottage hospitals and other small hospitals unable to keep the Revised Uniform System of accounts are urged to keep the "Simple Cash Account" which is shown in the appendix of the pamphlet now issued. It is impossible, states the Commission, to lay down any general rule as to the line of demarcation between the two classes of hospitals. The mere number of beds is not an adequate test of the ability to keep the Revised Uniform System, since some hospitals with a comparatively small number of beds and a large out-patient department may have a larger clerical staff than a general hospital with the same number of beds. It is suggested, however, that committees should not agree to the adoption of the Simple Cash Account in the case of hospitals with over fifty beds, except in exceptional circumstances.

HOSPITALS OF LONDON COMBINED APPEAL.

A special meeting of the President and General Council of King Edward's Hospital Fund for London was held at the House of Lords on August 1st, to authorize an interim distribution on account of the proceeds of the Hospitals of London Combined Appeal. Mr. M. C. Norman, Governor of the Bank of England, presided. Sir Alan Anderson (chairman of the Revenue Committee of King Edward's Hospital Fund for London and chairman of the Organizing Committee of the Hospitals Combined Appeal) said that at the end of the first stage of the appeal the amount in hand closely approached what was expected. Before the appeal was started in April Mr. Shrapnell-Smith hoped to get in £300,000 by July 31st. Including the money advised and intimated he now expected slightly to exceed £300,000; of this £271,000 was actually in hand, and large sums were coming in every day. On the other side of the account there were heavy expenses, amounting to date to about £30,000; this, however, was less than the Appeal Committee had been warned to expect. The free grant of space on hoardings had made it possible to reach the public by poster at about one-fifth the ordinary cost of such advertisement. The sum collected could not have been raised without the special advantages which the King's Fund had, and which no other appeal could have had. The support given to the appeal by the Royal Family was of immense value. The medical students also had been of enormous use, and had put life into everything they touched. The Hospital Savings Association, of which Lord Hambleden was chairman, was intended to bring regular weekly contributions from wage-earners to the hospitals. It was really to give the hospitals time to get those regular weekly contributions organized that the combined appeal was started. Sir Alan Anderson, in conclusion, mentioned that the temporary Government grant to hospitals had been subject to a fundamental condition that an equal sum should be raised from the public. The appeal had already succeeded in raising as much "new money" as the maximum amount of Government money at present available for London hospitals, and the newspapers and committees had been informed, accordingly, that the Government could no longer give "pound for pound" to balance new money contributed by the public. The Management Committee recommended that the King's Fund should pay to the co-operating hospitals cheques on account on some date between August 1st and August 15th, amounting in all to £150,000; and that a further payment on account should be made to each hospital after the holidays as soon as sufficient further information became available.

Correspondence.

THE TEACHING OF PSYCHOTHERAPY.

SIR,—Will you permit the intrusion into the discussion on psycho-analysis of one who is neither a neurologist nor a psycho-analyst, but who has in the course of desultory reading followed to a certain extent the literature dealing with the new method of interpreting dreams?

According to Freud (*Interpretation of Dreams* (translation), p. 483) "the interpretation of dreams is the *via regia* to a knowledge of the unconscious in the psychic life." It will be admitted, I think, that the existence of an unconscious mind in the sense that this is a storehouse of thoughts, is a prime factor in the psycho-analyst's position. Let us then for a moment examine the evidence.

In considering the process of thinking we must depend upon scientific analogy. Is not the most probable hypothesis that some stimulus sets up changes (chemical, and perhaps electrical) in a given cortical area, and that as associated areas become involved other thoughts are added, and that after the process is over these parts return to rest? This would explain conscious thinking, but leaves no place for the unconscious as the term is used by psycho-analysts. I have just read *The Psychology of the Unconscious*, by Jung, and found it a very interesting and learned study of myths and folklore, but as for the "unconscious" it is simply assumed. Psycho-analysts should therefore give us a statement compatible with physiology as to what they conceive to be the biological process involved. With regard to the interpretation of dreams, I presume that psycho-analysts still follow Freud. Now, this author seems to contradict himself with regard to a point of great importance. In his large work (loc. cit., p. 454) we read: "We must therefore admit that the dream invariably awakens us"; while in the *Introduction to Psycho-analysis* (translation), p. 76, he writes: "We do not wake up out of all dreams."

It would unduly lengthen this letter to give details as to the symbiology employed in interpreting, but it really seems that psycho-analysts refuse to admit an innocent dream—long objects mean the male organ, short ones generally the female; rhythmic movements like riding and going upstairs signify coitus, and so it goes on. To show that this is not a travesty I may again quote Freud (p. 241): "We have already asserted elsewhere that dreams which are conspicuously innocent invariably embody coarse erotic wishes."

Much more might be adduced to show the trend of thought adopted by psycho-analysts, but I shall conclude by asking another question. As obviously their elaborate code of symbols cannot be known to their patients, who

suggests the meanings to be utilized in interpretation? It may be a good thing to have worries talked over, but is it desirable to suggest sexual problems? It may be replied that these are the difficulties of one not conversant with the "new science," but most of us dream dreams on occasion and are able to judge for ourselves how far this unpleasant element enters into them.—I am, etc.,

Harrogate, Aug. 6th. P. McBRIDE.

AMAAS OR ALASTRIM.

SIR,—The letter from my old friend Dr. de Korté in your issue of July 8th (p. 65) provokes me to break a lance with him. My own opinion, based on experience in Central Africa, has led me to the belief that the names "amaas" and "alastrim" are merely synonyms for small-pox in mild form, but I am, of course, open to conviction.

Dr. de Korté states that "amaas, so called by the natives of South Africa, has been endemic for centuries." Surely this is rather a sweeping assertion. If we except the Cape peninsula and a comparatively small area round it, our knowledge of South Africa and the kaffirs belong almost entirely to the last century. Moreover, an expert bacteriologist like Dr. de Korté would not, as a rule, attach much weight to diagnosis and nomenclature belonging to the pre-scientific period. Dr. Livingstone, an early and accurate observer, nowhere, as far as I recollect, mentions anything but small-pox.

A footnote to history may shed some light on the subject. In 1881, or thereabouts, small-pox broke out in Kimberley, which at that time depended upon bullock wagon transport for all its supplies, fuel as well as food. As a result rates soon rose to a prohibitive figure and lack of fuel threatened to bring the mines to a standstill, and probably, what was regarded by many as equally important, the liquor supply showed signs of shortage. The authorities were in despair, but eventually, backed presumably by some medical opinion, they gave currency to the statement that the disease had been recognized as "Kaffir pox," which "did not attack Europeans." The scare subsided, the epidemic went on its way, and things resumed their normal course, but there were left behind the germs of a myth now grown to such dimensions as to have acquired a high-sounding name. I would ask Dr. de Korté if he can name any medical authority who had recognized "amaas" as a separate disease before 1880.

That Europeans rarely contract small-pox from natives is true, for the simple reason that they are generally protected by vaccination. When not so protected they may become infected in virulent form from very mild cases of the disease, such as would, I presume, be called "alastrim." For the truth of this I can vouch from experience.—I am, etc.,

London, W., July 11th. R. U. MOFFAT, M.D.

*** We have received from Mr. H. A. Moffat, F.R.C.S., of Cape Town, a letter dated June 27th giving information very similar to that contained in the third paragraph of the letter printed above. He says that it was announced that "the disease was not small-pox but the comparatively harmless thing labelled 'amaas.' The scare subsided and the price of wood fell. Vaccination had been carried out and the cases isolated, and the epidemic also subsided."

CALCIUM DEFICIENCY AND COD-LIVER OIL.

SIR,—The investigations of Grove and Vines on calcium deficiencies and their treatment by parathyroid, the results of which were published in your issue of May 20th, 1922, may on further pursuit afford a rational basis for the treatment of some diseases at present carried out empirically with greater or less success.

One of these diseases is phthisis, and it is noteworthy that the treatment proved by long experience to be most efficacious in it is a combination of fresh air, sunlight, milk, eggs, and cod-liver oil, and it is significant that the recent work on rickets[1] has shown that cod-liver oil and sunlight exert a markedly favourable influence on the calcium metabolism of the body, which will no doubt on investigation prove to be definitely associated with an increase of ionic calcium in the serum, and it is well known that milk and eggs are foods particularly rich in organic calcium.

It is also highly significant that in the only case of tuberculosis recorded in their paper, Grove and Vines found a marked and intractable deficiency of ionic calcium in the serum, and that it was only on the restoration of the calcium content of the serum to normal that the process of healing commenced.

It is, moreover, stated by Fisac that few or none of those employed in lime works, and who therefore habitually inhale, and presumably absorb, large quantities of lime dust, ever contract phthisis, even though living in squalid dwellings and underfed, and this is corroborated in a striking manner by Tweddell.[2]

Pathology also teaches us that the complete healing of tuberculous lesions in the lungs is associated with the deposition in them of calcium salts. *Per contra*, pregnancy and lactation, which are known to impose a severe drain on the calcium resources of the body,[3] are recognized to be particularly fatal to those affected with pulmonary tuberculosis.

I would therefore suggest that the value of cod-liver oil, milk, eggs, and sunlight, in phthisis is in all probability due to their favourable influence on the calcium metabolism of the body, and that their effect in this respect may be found to be heightened by the simultaneous administration of parathyroid or other calcium-conserving endocrine substance. Cod-liver oil might advantageously be administered during pregnancy and lactation, and in other conditions associated with great calcium katabolism, where the ionic calcium of the serum is on investigation found to be persistently diminished.—I am, etc.,

Asansol, Bengal, June 22nd. JOHN W. TOMB.

THE TREATMENT OF TUBERCULOSIS WITH COLLOID CALCIUM.

SIR,—Since publishing my article in your JOURNAL (January 14th, 1922, p. 53) I have had a good many inquiries about the best methods of administering colloid calcium, and as I have been giving it largely since that time I think it would be well to add a little to the information given in that paper. I may say that since using this drug the running of the sanatorium has been much easier than formerly owing to the beneficial effects produced. In addition to giving injections I have for some months been giving it by the mouth; the preparation I have used was the same as that used for injections, except that it contained 3 grains of calcium lactate to the dose, the dose used being 1 drachm, given one, two, or three times a day. This method has been peculiarly successful in reducing sputum and getting rid of tubercle bacilli from the sputum. I have reason for supposing that given by this method the action is rather different than when injected; the dose is certainly much greater. It seldom produces any untoward symptoms, but it is well to keep a chart of the temperature whilst it is being administered. In one case of ischio-rectal abscess in which a deep sinus had persisted for weeks, and in which the injections, though otherwise beneficial to the patient, had not caused healing, administration of calcium by the mouth three times a day for thirty-six hours was followed by cessation of pus formation; the packing was taken out, and the sinus healed in a few days. In the case of children with persistent febrile temperatures the action of this drug given by injections is little short of wonderful, and in surgical tuberculosis it would seem in these northern latitudes to be able to take the place of heliotherapy.

With regard to the administration, I am of opinion that where injections are given it is quite sufficient to give 0.5 c.cm., and after the first injection it is well to wait a week to see if there is any reaction, as there seems little doubt that in some cases this drug either extracts toxins from the bacilli or else produces absolute lysis of the bacilli; indeed, this may be one of the causes of the benefit which ensues. In a number of cases the injections do not need to be given oftener than once a fortnight. In acute febrile cases caution is required, and smaller doses should be used or small doses of calcium by the mouth administered. As a rule, 0.5 c.cm. is sufficient to stop haemorrhage.

If medical men would treat their suspected cases by this method a great deal of avoidable sickness would be prevented, and if it were tried on chronic cases often great amelioration of symptoms would be produced.—I am, etc.,

New Cumnock, July 1st. EDWARD E. PREST.

[1] *Journ. Amer. Med. Assoc.*, January 21st, 1922, p. 159, and BRITISH MEDICAL JOURNAL, May 27th, 1922, p. 831.

[2] *Medical Record*, January 28th, 1922, p. 141.

[3] *Journ. Amer. Med. Assoc.*, May 13th, 1922, p. 1460.

BONE-GRAFTING IN TUBERCULOUS SPINAL CARIES.

SIR,—Among Sir Henry M. W. Gray's most interesting remarks in favour of bone-grafting in tuberculous spinal caries occur several statements open to serious criticism, to which I feel bound to call attention.

1. He states that "fixation is essential to success"; and then that "all are agreed on the difficulty of fixing the spinal column efficiently by external splinting so that movement is entirely prohibited." Let me say at once that fixation in the sense in which he uses it here is not essential to success, and that therefore the difficulty he alleges does not arise. Dr. Rollier at Leysin, between the years 1903 and 1913, treated 198 cases of Pott's disease, of whom 171 were cured, and in no case did he attempt such fixation; what he did try to obtain was physiological rest, which is prevented by absolute fixation.

2. Sir Henry Gray states that in six to twelve months after the operation the patient may be leading a normal life except for the slight restriction imposed upon him by the stiffness of the part operated upon, and that therefore by operative fixation much time is gained for the patient when compared with fixation by external splinting. At first glance he does seem to have found here a valuable argument in favour of the operation, for the average period of treatment by heliotherapy is twelve to eighteen months, but he ruins it at the end of the same paragraph by excluding from his statement all cases with abscess. He says:

> "If abscess has developed the time taken in the process of cure largely depends on the behaviour of the abscess, which is uncertain. Until the abscess in connexion with the vertebral bodies is cured no relaxation of treatment ('that is, fixation by external splints') should be allowed."

Now, if any large number of cases of Pott's disease be investigated it will be found that abscess is present in a very large percentage; thus in Rollier's 198 cases there was abscess in 95, or 48 per cent; so that on Sir Henry's own showing, even if he is right, nearly half the cases would not be cured any quicker by operative methods.

3. He states that in his experience the operation has not proved dangerous, as only one death which can be directly attributed to the operation occurred in his series of 28 cases. He then quotes Hibbs (against himself it seems to me), with 31 deaths in 210 cases; and, not quite so bad, Meyerding, with 8 deaths in 100 cases. If we add these three sets together, 23 with 1 death, 210 with 31 deaths, and 100 with 8 deaths, we get 238 cases with 40 deaths, or 16.8 per cent. Does Sir Henry consider that an operation with such a mortality can be rightly described as not dangerous? As a contrast to the small mortality following operation he quotes (1) a statement made by Royal Whitman in 1901 that "at least 20 per cent. of all patients die during the progress of the disease"; and (2) a statement made by Lovett in 1907 that "the mortality is probably not under 33 per cent. if ultimate results are considered." Could he have not quoted from a more up-to-date book, as, for example, Rendle Short's *Index of Prognosis*, 1918, second edition, where we are told that we may take it that the mortality is about 5 to 10 per cent.?

4. He states that operation should be done before deformity occurs, but he surely must know that it is usually the onset of deformity which first draws attention to the presence of disease. If deformity be present he tries "by postural methods to bring about gradual straightening." "If these fail, and they frequently do," he deliberately breaks the grafts to adapt them accurately to the curvature. It is not surprising that the postural methods frequently fail, for how can he give them any chance when his advice is: Perform the operation "as soon as possible after the disease is diagnosed"? As regards leaving the deformity alone, is not this absolutely a retrograde step? Rollier has shown that in all active cases the deformity can be entirely reduced except in the cervical and lower lumbar regions. Can we then advise patients to have an operation to cure (*sic!*) them, and thereby force them to remain humpbacked for life, when another form of treatment can make them perfectly straight?

5. He states that by reason of the bony fixation the patient is less likely to suffer from local recurrence of the disease than after "conservative" treatment. This gives the impression that under "conservative" treatment relapse is frequent. Yet if we turn to Dr. Rollier's published statistics we find that between the years of 1903 and 1913, out of 171 cases of Pott's disease cured, there were only 2 relapses.

From the foregoing remarks, I think I have made it clear that there is everything to be said against this operation, in spite of Sir Henry Gray's optimism. If anything more were needed to open your readers' eyes to the real state of affairs, let them turn to the paragraph headed "Results of Operative Treatment," where occur the following sentences:

(*a*) "One patient, a young weakly child, 4 years of age, died on the third day after operation."
(*b*) "One adult died within two months of operation from progressive disease in the spinal cord and canal."
(*c*) "In another adult psoas abscess continued to increase."
(*d*) "In one child operated on when 6 years of age the disease has apparently been cured, but deformity has increased."

Many years ago an operation was invented for curing microcephalic idiots. The idea of the operation, called craniectomy, was that the brain could not expand because of the smallness of the cranial cavity, and so large portions of the cranium were cut away to give the brain room. Although it soon became known that many of the children died under the operation, that those who survived it ended up in asylums, and that the operation had been wrongly conceived—the size of the skull depending upon the size of the brain, and not vice versa—yet surgeons went on performing this dangerous and useless operation in ever-increasing numbers, and it was not until Dr. W. W. Keen wrote his famous paper entitled "Noli Nocere" that their eyes were opened and they were able to perceive the error of their ways. Is it too much to hope that this history may soon repeat itself?—I am, etc.,

PAUL BERNARD ROTH,
Orthopaedic Surgeon, Miller Hospital, etc.

London, W.1, July 25th.

"DOCTORS IN COUNCIL."

SIR,—The *Manchester Guardian* had a leader last week under the above title dealing with the deliberations of the Representative Meeting at Glasgow. Part of the leader dealt with the future of voluntaryism at hospitals and the position of the doctor in relation to any new arrangement of hospital affairs, and in this part it expressed the opinion that the discussion at the Representative Meeting was "unsatisfactory . . . because so much of it draws a kind of formal veil between us and realities." It went on to say that:

> "Appointments on the staff of a great hospital are nominally honorary, but not really so, for, though they are unpaid, they are the recognized entrance gates to the most lucrative fields of private practice."

This view, which is, I believe, common to the laity, deserves more attention from the profession that it has yet received, for it will seriously interfere with the carrying through of hospital reform, and with the status of the staff of the hospital when reform is carried.

I wrote the enclosed letter to the *Manchester Guardian*, and it was published on July 28th; but as it pertains to matters which I believe are of still more importance to the medical profession than to the laity, and as it will become more and more necessary for the profession to educate the laity on this question, I am in hopes that you will consent to publish it along with this letter.—I am, etc.,

York, Aug. 1st. PETER MACDONALD.

THE VALUE OF HOSPITAL STAFF APPOINTMENTS.

To the Editor of the Manchester Guardian.

SIR,—In your generally well-informed leader of the 24th on "Doctors in Council" there runs through that part of it concerned with the position of voluntaryism the thought that the position of the honorary staff in voluntary hospitals is not essentially honorary, inasmuch as indirectly it is a source of emolument. In your own words "appointments on the staff . . . are the recognized entrance gates to the most lucrative fields of private practice." As this view, which is a common one, interferes largely with what I am convinced is the sound line for hospital reform, I trust you will allow me to comment upon it.

While there is a large although varying amount of truth in it, varying with the hospital concerned, it is on the whole misleading and indicative of confused thinking, especially on two chief lines. The first is that it confuses hospitals generally with the relatively few, although, of course, relatively very important, hospitals in the large centres, and especially those at which there are teaching schools. Here positions on the honorary staff are exceedingly valuable and indirectly lucrative, and far more than repay the services given in these positions. This relationship, however, between value of position to the member of the staff and value of his services to the community is not a constant one, but varies with the geographical position of the hospital, and the more peripheral (so to speak) the hospital is the lower becomes the value of the position on the staff relatively to the service—this even in the same city—until in the small hospitals in the smaller centres of population the value of the services far and away outweighs the indirect value of position on the staff. Now these smaller hospitals are

becoming, if they are not already, by far the most important class of hospital to the community, for even in the large cities the tendency is, or soon will be, to decentralize, and it is conditions at these, which should set the pace, and which should have the chief consideration in regarding the future, and not the conditions in the large hospitals, which bulk so largely in the public mind, and in your own also, if one may judge from your leader.

The second indication of confused thinking in your leader is that it fails to recognize that where hospital appointments are valuable to the holders they are so, not so much in themselves as in the fact that others are shut out from holding them; and unquestionably there has been and still is found evidence of action by honorary staffs which indicates a subconscious if not conscious endeavour to keep hospital appointments within a sacred ring. There is, in fact, a vested interest in voluntaryism which subconsciously interferes with the possibility of those who arrive at "the most lucrative fields of private practice" being able to have an open mind on the question.

This state of affairs is unlikely to persist; many things are tending to break it down, among them the recognition by some of us doctors that it is in the interest of medicine, of the doctors, of the community, that the largest possible access to hospitals, and not the least possible, should be given to doctors generally. Further, the nation may presently begin to recognize that public health demands the increase of hospital beds from 1 per 1,000 to 3 per 1,000 of the population, as Sir Napier Burnett advises, and with this the monopoly value of hospital appointments will largely disappear.

Your paper is generally so wise on the great public questions that I trust you will at least give this matter further consideration, and that you will recognize that the "doctors in council," though as yet only groping for a policy, may be groping towards the light.—I am, etc.,

Ouse Lea, York, July 26th. PETER MACDONALD.

STERILIZATION OF MENTAL DEFECTIVES.

SIR,—The correspondence on this subject initiated by Colonel Lister ought to fulfil a very useful purpose. The proposal is one which appeals to a great many people, and its apparent advantages warrant full discussion and unprejudiced consideration.

It is certainly unfortunate that already arguments diametrically opposed are being employed, based on differing reports of American experience. Mr. Norman Haire refers in the JOURNAL of July 15th (page 110) to the "methods so widely and beneficially used in the United States," and presents a very different picture from that given by Dr. Whitwell a week previously.

If it be true that sterilization by any method is used "widely and beneficially" in America, then an extremely powerful argument is provided for those who desire to introduce the procedure into this country. Last week I had the pleasure of meeting a New York hospital surgeon, a delegate to Europe of the American Red Cross, who takes a deep interest in all problems affecting the health of the community, and his opinion is that the results of sterilization of mental defectives in the United States are negligible.

In view of such a conflict of opinion it seems very desirable that statistics from America should be ascertained and published so that there may be some authoritative basis for discussion. It should be possible to find out for each State:

(*a*) For how many years the law under which these operations may be performed has been in force?

(*b*) Whether permission is required from the mental defective or relatives before sterilization can be effected?

(*c*) The total number of operations.

I hope this will be done.—I am, etc.,

Gloucester, July 16th. W. ARNOTT DICKSON.

SIR,—I was a school medical officer for two years in a large English county. In nearly every school I inspected there were from one to five or six mentally defective children, according to the numbers attending. There were others either quite imbeciles or epileptics not actually attending school. I feel that everyone who has been a school medical officer will support the plea of Lieut.-Colonel A. E. J. Lister, contained in his letter of July 1st, as to the necessity of taking effective steps to prevent the increase of these unfortunate people.

In one school I had a mentally defective boy of 13 years of age. He could learn nothing and could not even speak intelligibly. His mother came to me complaining bitterly that it was hard that he could not leave school to go to work. She did not in the least realize that he was mentally defective, because she said, "When I was at school I could never learn anything myself."—I am, etc.,

Clifton, Bristol, July 24th. L. MARGARET LISTER, M.R.C.S., L.R.C.P.

THE DENTISTS ACT AND REGISTER.

SIR,—There is reason to think that the postponement of the date on which the Dentists Act, 1921, will come into force from July 28th until November 30th this year has given rise to some misapprehension. I am therefore directed to write and say that any practitioner who has been registered comes within the jurisdiction of the Board, and should pay very careful attention to its warning notice in regard to advertising and canvassing. The extension of the Act does not permit any relaxation in regard to this.

It is possible that there are some practitioners who have been notified that they are eligible for registration who are refraining from completing their applications in order that they may be able to continue the practice of advertising and canvassing. If any such cases were brought to the notice of the Board this matter might have a bearing on the question of good personal character.

There are some practitioners who have in their employment assistants who are intending to pass the prescribed examination as soon as they can. The Board would be unwilling that these unregistered assistants should be penalized. At the same time the warning notice in regard to "covering" must be observed, and such assistants should confine their work to mechanical duties or to matters which do not require professional discretion or skill, and should perform them only under the immediate personal supervision of their employers.

I have to add that the concession that ex-service candidates may count work done up to July, 1922, instead of only to July, 1921, has no bearing upon the eligibility for registration of those who had not attained the age of 23 years on July 28th, 1921. The question of age is one upon which the Act is very definite, and the Board has no discretion in regard to this matter.—I am, etc.,

London, W., Aug. 5th. NORMAN C. KING, Registrar.

THE MEDICAL DIRECTORY, 1923.

SIR,—The annual circular has been posted to every member of the medical profession. Most of the returns have already been received. If any practitioner has not yet sent us the latest information, we shall be glad to receive it by an early post.—We are, etc.,

7, Great Marlborough Street, London, W.1, Aug. 2nd. THE EDITORS.

Obituary.

ARTHUR RANSOME, M.D., M.A., F.R.C.P., F.R.S.

THE death of Dr. Arthur Ransome on July 25th, at the age of 88, has robbed the medical profession of one who brought it honour in many ways. He was the son of Mr. J. A. Ransome, and was born in Manchester. He received his early education at Manchester, went first to Trinity College, Dublin, and later to Caius College, Cambridge, of which he subsequently became an honorary Fellow. His career at Cambridge was distinguished. He was senior optime in the Mathematical Tripos, and in 1856 took a first class in the Natural Science Tripos; he was lecturer on biology from 1857 to 1861. From Cambridge he went to St. George's Hospital, London, and studied also in Paris. From 1880 to 1895 he was successively lecturer and professor of hygiene and public health at Owens College, Manchester, and for many years he was consulting physician to the Manchester Hospital for Consumption and Diseases of the Chest and Throat; later on he became physician to the Royal Victoria and West Hants Hospital. He was Vice-President of the Manchester and Salford Sanitary Association, and examiner in sanitary science at the Cambridge and Victoria Universities. In 1890 he delivered the Milroy lectures before the College of Physicians, when he took the etiology and prevention of phthisis as his subject. In 1897 he was the first recipient of the Weber-Parkes prize for an essay on tuberculosis.

This record gives but an inadequate impression of the achievements of a man who did fine pioneer work in connexion with the prevention and treatment of tuberculosis, and attained a reputation of cosmopolitan range. Arthur Ransome belonged to that not inconsiderable class of men who add much to the sum total of human knowledge but whose identity becomes merged in their work, so that posterity is apt to forget how great were their services. Ransome's gifts were great and many, and though he may not have laid any corner stone, his was the valuable work which fills in important gaps in the masonry, giving to it support and cohesion.

Comparatively early in his career he began to be interested in tuberculosis, and almost all his subsequent publications dealt with this subject. As early as 1876 he published a monograph on stethometry, and it is eloquent of the solid character of his work that it is still quoted in modern textbooks of diseases of the chest. In 1882—the year signalized by the discovery of the tubercle bacillus by Koch—Ransome published a valuable work on prognosis in lung disease, and two years later followed this up by an essay on the causes of consumption. Unlike many specialists in tuberculosis at this time, he did not take a partisan attitude with regard to the conflict raging over the respective merits of the "soil" and the "seed" in the genesis of this disease, for he was convinced that both played an important part. This capacity to see more than one side of a case at a time was characteristic of a man of many parts. For not only was he a mathematician and biologist, but he was also an anatomist and a chemist (he was Caian scholar in anatomy, and Mecklenburg scholar in chemistry). Apart from the question of personal predisposition to tuberculosis, insanitary conditions were, in his opinion, an important factor; he once stated that he had never come across an instance of infection, direct or indirect, in a well-ventilated house in this country; where illness followed infection the rooms were always dark, dirty, and ill ventilated. He also showed that during the warmer part of the year tubercle bacilli can grow on damp wall-paper, and that a permanent source of infection might exist in this way. One of his experiments, which still stands as a specimen of first-class research, was in connexion with the action of sunlight on the tubercle bacillus. He exposed some virulent sputum to fresh air and sunlight on dry, sandy soil, and though the exposure was not long enough to pulverize the sputum, none of the specimens remained virulent. Other specimens, kept in a dark cupboard with very little air, remained virulent for nineteen and thirty-five days respectively, as shown by inoculation of guinea-pigs. When specimens were exposed to currents of air in the dark, their virulence was reduced, but to a less degree than by sunlight. In 1890 he again published a work on the causes and prevention of phthisis, and as late as 1914 he was adding useful contributions to our knowledge on this subject. We have already referred to his cosmopolitan reputation, and in Germany, at any rate, he was recognized as not only an authority, but a pioneer, in the study of tuberculosis; he was for many years, and up to the time of his death, an associate editor of *Zeitschrift für Tuberkulose*.

Though his sphere of activities was in the provinces, the last thing to be said of his work and outlook was that they were provincial. Indeed, much of his best work appeared at a time when it could with some justice be said that the attitude of his colleagues in London towards tuberculosis was a trifle reactionary, if not provincial, and he enjoyed the doubtful privilege of being ahead of his time, and more than a head and shoulders above the crowd.

EDWARD HUGH EDWARDS STACK, M.B., B.CH.CANTAB., F.R.C.S.ENG.

WE regret to learn of the death of Mr. E. H. E. Stack of Clifton, Bristol, which occurred on August 3rd in London, at the age of 55. He was the third son of the Rev. Canon Stack, and was born at Langfield, co. Tyrone. He received his education at Haileybury, Pembroke College, Cambridge, and St. Bartholomew's. In 1892 he took the Conjoint qualification and the degrees of M.B., B.Ch.Camb. In the same year he won the Brackenbury Medical Scholarship at St. Bartholomew's and became house-physician to Dr. Gee. He subsequently held the posts of ophthalmic house-surgeon as well as extern and intern midwifery assistant. In 1897, after obtaining the F.R.C.S.Eng., he was appointed house-physician at the Bristol Royal Infirmary and later (1902) house-surgeon. In 1906 he was elected assistant surgeon, and in 1914 surgeon, to the Bristol Royal Infirmary. On the death of Dr. Alexander Ogilvy in 1914 Mr. Stack was appointed ophthalmic surgeon, and devoted himself entirely to this special branch of surgery during the remainder of his life.

In addition to his appointments at the Royal Infirmary Mr. Stack was surgeon to the Bristol Eye Hospital and consulting surgeon to the Cossham Hospital; for many years he had been surgeon to the Bristol Orthopaedic Hospital. He served as Captain R.A.M.C.(T.F.) during the war, and did excellent work as ophthalmic specialist at the 2nd Southern General Hospital in Bristol and at 56 General Hospital in France.

To few men has it been given to master so readily and to excel in any branch of clinical medicine that he essayed. Whilst in residence at the Bristol Royal Infirmary his successful coaching in midwifery seemed to point him out as a rising obstetrician. As a physician his clinical acumen and powers of diagnosis were remarkable, and no small part of his success as a surgeon might be attributed to his sound knowledge of internal medicine. He chose, however, the practice of surgery, and in this branch of the profession his skill in carpentry and wood-carving stood him in good stead; he had the perception of an artist combined with the hand of a craftsman. When in 1914 he turned to ophthalmology he soon showed that the teaching and example of Henry Power and Bowater Vernon were not forgotten. He was a neat operator, a gifted refractionist, and, above all, displayed a singular grasp of the medical aspects of eye diseases.

Throughout his life his enthusiasm for the welfare of the medical students had been intense. He was passionately loyal to his old hospital—Bart.'s—but was scarcely less devoted to Bristol, the school of his adoption. In athletics, in amateur dramatics, and in all the social activities of the medical school Stack was a leader and a mighty encourager of youth; and he spared himself neither time nor labour in teaching. His grinds and ward classes were always well attended, for he added to the knack of clear exposition a fund of apt anecdote that helped to fix the dullest facts in the dullest minds. His memory for patients' faces, names, and ailments was uncanny; it was said that he had on one occasion recalled a patient's name, address, and whole family history from mere inspection of the scar of an operation wound.

Stack was a warm-hearted impulsive Irishman, who made friends wherever he went. His early death will be widely and deeply mourned. He leaves a widow, three sons, and a daughter, to whom our heartfelt sympathies are offered.

WE regret to record the death of Dr. JOHN MAITLAND FORSYTH, M.C., which took place at Singapore on June 26th. He was the only son of Robert C. Forsyth, of Tainanfu, North China, and graduated M.B., Ch.B. at Glasgow University in 1912. He was a captain in the R.A.M.C. during the war, his gallantry being twice recognized by the award of the Military Cross and bar. In 1920 he went out to Singapore to join Dr. Galloway in partnership, and during his two years' residence there he made many friends and earned the esteem of all. He was a prominent member of the local Branch of the British Medical Association and its representative on the Medical Council of the Straits Settlements and Federated Malay States.

CAPTAIN N. N. G. C. MCVEAN, I.M.S. (ret.), died aged 42, on July 21st, at the house of his brother-in-law, Major H. B. Luard (I.M.S. ret.), at Little Baddow, Chelmsford, after a month's illness; he was buried on July 26th in the family grave at Oban, Argyllshire. He was the youngest son of the late Colin A. McVean of Kilfinichen, Isle of Mull, and was educated at Watson's College, Edinburgh, and Edinburgh University, and entered the Indian Medical Service in 1905, serving in the Punjab and afterwards in the Gulf of Persia as agency surgeon. When the war broke out he proceeded with the 62nd Punjabis to Egypt, when he was present in the action at the repulse of the Turks on the Suez Canal, and afterwards at Aden, whence he was invalided home in 1915. For the last seven years, after several operations, he led a life of much suffering in a state of extreme emaciation, borne with wonderful fortitude and good cheer. He had a very active mind and an indomitable spirit, which overcame the lassitude and exhaustion of his invalid state, and almost to the end continued to take an active part in his profession, acting as assistant in various practices, or on Pension Boards in London, or in hospitals, including, during the latter part of the war, service as a civilian practitioner at the Colchester Military Hospital, and in V.A.D. Hospitals at Bournemouth and at Glasgow. It may truly be said that he died for his country, and was an ornament to his distinguished service, in which he will be remembered by many friends as well as in this country, for he had a wonderful gift of friendship. He rests under the shadow of his native Highland hills, which he loved so well.

Universities and Colleges.

UNIVERSITY OF OXFORD.

AT a Congregation held on August 4th the following degrees in medicine were conferred:

B.M., B.CH.—D. G. Leys, W. S. Tunbridge.

Degree days for next term are announced as follows: Thursday, October 19th; Thursday, November 2nd; Saturday, November 18th; Thursday, November 30th; Saturday, December 16th.

UNIVERSITY OF LONDON.

A MEETING of the Senate was held on July 19th.

The following were recognized as teachers of the University at the institutions mentioned and in the subjects indicated:

University College: Mr. J. L. Shellshear and Mr. R. A. Dart (Anatomy).
St. Thomas's Hospital Medical School: Mr. T. Carnwath (Hygiene), Mr. P. H. Mitchiner (Surgery), Mr. W. Rushton (Biology).
London (R.F.H.) School of Medicine for Women: Miss Emily C. Lewis, Mr. L. E. C. Norbury, Mr. C. E. Shattock, and Mr. C. A. Joll (Surgery).

Dr. W. L. Symes was re-elected acting director, and Mr. H. L. Eason, C.B., C.M.G., M.S., treasurer of the physiological laboratory for 1922-23.

Professor A. J. Clark was appointed chairman of the Board of Examiners in pharmacology for the second examination for medical degrees for the year 1922-23.

Professor Adrian Stokes, D.S.O., O.B.E., was admitted to the Faculty of Medicine.

The following grants were made for 1922-23 out of the Thomas Smythe Hughes Medical Research Fund:

£100 to Dr. Charlotte L. Houlton, of the London (R.F.H.) School of Medicine for Women, for an investigation of vaginal secretions with a view to the discovery of some prophylactic method for the prevention of puerperal infection.

£25 to Dr. Vasant Ranji Khanolkar, of University College Hospital Medical School, for an investigation of the presence of non-specific antibodies against proteins with a view to further insight into the nature of non-specific immunity.

It was decided that, in and after October, 1922, the clinical examination in surgery at the M.B., B.S. examination be so arranged that each candidate shall have thirty minutes for examining two cases before he is questioned on them by the examiners, and that the length of the clinical examination be in all forty-five minutes.

Human anatomy has been added to the list of subsidiary subjects that may be offered at the choice of the candidate at the B.Sc. Honours examination in physiology for external students.

The Vice-Chancellor, Mr. H. J. Waring, has been elected chairman of the Co-ordination and Developments Committee for 1922-23.

Dr. T. G. Stevens has been appointed a staff examiner in obstetric medicine for 1922-23.

Medical News.

THE French Minister of Health, M. Paul Strauss, who is in London in connexion with the holidays of French children from devastated areas, is taking the opportunity of studying public health administration in this country. He was entertained at lunch by the First Commissioner of Works on Thursday last, when Sir Alfred Mond was in the chair.

A DEPUTATION from the People's League of Health waited on Sir Montagu Barlow, Parliamentary Secretary to the Minister of Labour, on August 2nd, to place before him some of the physiological and psychological effects of unemployment and of the "dole" upon the health and habits of the industrial community. Sir Bruce Bruce-Porter said that not only was the unemployment benefit insufficient to keep the worker fit, but it was not spent to the best advantage because the recipient was generally unversed in food values. He urged that means should be provided to enable the recipient to obtain by means of food tickets a standard balanced diet in part substitution for the money benefit. Professor Lyle Cummins dwelt upon the connexion between unemployment with its reduced income and ill health as instanced by the number of persons applying for tuberculosis benefit during times of industrial crisis or depression. Dr. W. A. Potts of Birmingham traced certain psychological disorders, which manifested themselves either in revolutionary agitation or in moral delinquency, to ill health caused by insufficient food. Sir Montagu Barlow said that while he fully appreciated the serious effect produced on health by prolonged unemployment, he thought that there would be danger of the improper use of the proposed food tickets, and that elaborate supervisory machinery would be required. Captain Donald Simson, who represented the British Legion, outlined a scheme whereby the sums now spent on unemployment benefit might be diverted into productive channels; the benefit would be paid to local authorities or private employers to cover partly the wages of unemployed men whom they had taken on. This scheme was supported by Dr. Fremantle, M.P.; and Mr. C. J. Bond spoke of the measures taken by the Leicester Distress Committee to institute public works, such as road widening, in order to provide for the unemployed; the secret of success in this instance lay in the integration of a certain amount of highly skilled labour with the unskilled. Sir Montagu Barlow reminded the deputation that the insurance fund was made up largely by the contributions of workpeople who were still in employment. These had contracted under the scheme for the payment to them of benefit when unemployed, and as trustee of the fund the Government, except by amendment of existing legislation, could not divert sums in its charge to purposes other than those provided under the scheme. He added, however, that schemes on the lines of Captain Simson's proposal were under the consideration of the Government.

THE principal functions of the Health Organization of the League of Nations, which was established in September, 1921, are to conduct an international epidemiological information service and to promote international co-operation in the control of epidemic diseases. It also advises the League in matters affecting health and co-operates with the International Labour Organization in promoting industrial hygiene. The International Health Board of the Rockefeller Foundation has now agreed to provide the Health Organization of the League with a sum not exceeding 32,840 dollars a year for a period of five years to maintain the inteiligence service, and a further sum not exceeding 60,080 dollars a year for three years to put into effect the scheme for the international exchange of public health personnel, to which we recently referred.

THE Association of Medical Officers of Fever Hospitals has decided to join the Society of Medical Officers of Health as the Group of Medical Officers of Fever Hospitals. At a meeting of the group held on July 31st Dr. E. W. Goodall, O.B.E., North-Western Hospital, Hampstead, was elected president, and Dr. A. F. Cameron, Joyce Green Hospital, Dartford, Kent, honorary secretary of the group. Candidates for election as members of the group are asked to send their names to the honorary secretary as soon as possible in order that they may be included in the list of members for the coming year which is now being prepared.

THE programme of the forthcoming session of the Medico-Legal Society has been issued by the honorary secretaries, Mr. Ernest Goddard and Mr. B. H. Spilsbury. The first meeting will be held on October 17th and the annual dinner on December 15th. At the annual general meeting held last month it was resolved unanimously that the annual subscription be raised to one guinea, with effect from the beginning of next year.

ON the occasion of his retirement from the acting honorary staff of the Stratford-upon-Avon Hospital, Dr. R. Latimer Greene was presented with a silver salver, a cheque for £175, and a book with the names of the subscribers, in recognition of his services to the hospital for upwards of forty years. The governors have appointed Dr. Greene honorary consulting medical officer to the institution.

THE Ashby Memorial Research Scholarship in Diseases of Children of the University of Manchester has been awarded to Miss Ruth E. Conway, M.B., Ch.B.Manch., M.R.C.P., who will undertake an investigation into the reaction of the blood and its relation to the bicarbonate content in cases of clinical acidosis—(1) in relation to anaesthesia, (2) in relation to diabetes in children.

MR. H. C. DYSON, of Epsom College, has been elected to the Epsom Scholarship, tenable concurrently with the Carr Scholarship from Epsom College at University College, London.

AN international conference of medical women will take place at Geneva during the first week of September. The first congress was held in New York in 1919. The authorities of the University at Geneva have kindly granted accommodation for the meetings of the conference. Subjects of international medical importance on which the opinions of medical women of the world should prove of value will be considered. The members of the conference will also be invited to place the constitution of the International Medical Women's Association on a permanent basis. The proceedings will begin with an inaugural banquet on September 4th, and will extend for four or five days.

THE golf competition under handicap for the Llandrindod Wells Medical Challenge Cup, value 50 guineas, will take place on September 20th, 21st, and 22nd. The entrance fee is 5s., and the competition is limited to qualified medical practitioners. Entries, which will be received up to the first post on Tuesday, September 19th, should be sent to the Secretary, Golf Club, Llandrindod Wells. Further details will be found in our advertisement columns.

A COURSE will be held at Bethlem Royal Hospital, commencing on September 18th, of lectures and practical instruction for the Diploma in Psychological Medicine granted by various universities. It is proposed in future to give two courses each year—an autumn session of intensive character, commencing in September and completed in early December, and a spring session, commencing in the middle of January and completed in the middle of April. Each course consists of two parts: Part A includes lectures and demonstrations on the anatomy, histology, and physiology of the nervous system, with lectures on psychology and demonstrations in experimental psychology. Part B comprises lectures and clinical demonstrations in psychology, including lectures and demonstrations in the morbid anatomy of the nervous system, a series of lectures, with clinical demonstrations, on different branches of psychological medicine, and lectures, with clinical demonstrations, on mental deficiency. Entrants for the course who pay a composition fee of 15 guineas may, if due notice is given, attend either Part A or Part B of one course and postpone the other part until the next session. An entrant who wishes to attend one part only pays a fee of 10 guineas. An entrant who takes the complete course can attend the general clinical practice of the hospital on payment of 5 guineas for six months or 10 guineas for one year, but an entrant who does not take either part of the course, and desires to attend the clinical practice of the hospital, must pay a fee of 5 guineas for each three months of attendance. Further particulars may be obtained from the Physician-Superintendent, Bethlem Royal Hospital, S.E.1.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

DR. H. D. O'SULLIVAN (Burton-on-Trent) desires to obtain statistical evidence on the question of danger to the child in "twilight sleep" confinements.

TREATMENT OF CRAMP.

DR. JOHN M. MUNRO (Kingston, Ontario, Canada) writes in reply to "M.D.Edin." (May 6th, p. 744): I had a similar case which responded well to the following treatment, the patient now being able to be about without any discomfort and all the swellings having disappeared.

1. Antirheumatic diet and saline purge every other morning.
2. Paint joints with ung. iodi and ung. methyl salicylate, rubbing in well till colour disappears, and then cover with flannel—say, morning and evening.
3. Take internally—

℞ Ac. salicyl. ... ... ℥ss
Ferri pyrophosphatis ... ... ℥j
Sodii phosphatis ... ... ℥x
Aquae ... ... ad ℥vj

Sig.: A tablespoonful every two hours.

The mixture is taken as indicated until improvement justifies less frequent doses, or unless constitutional effects are produced.

TREATMENT OF CYSTITIS IN PARAPLEGIA.

"S. J. C." recently treated cystitis following catheterization, for retention in a case of spinal paralysis, by perineal urethrotomy, cutting down on to a grooved staff where it entered the bladder. A large rubber catheter was kept in through the perineal wound for a couple of days and a sound passed by the urethra and the perineum for several days following. The cystitis cleared up almost immediately. The bladder is now readily emptied by pressure on the lower abdomen above the pubis. The wound was allowed to heal naturally. Our correspondent wishes to know whether this method of preventing catheter fever, cystitis, and nephritis as a sequela, has been used by others.

INCOME TAX.

"JUNIOR PARTNER" inquires as to the effect of the following car transactions: Bought, October, 1920, a second-hand Bayard car, 8–10 h.p., for £300; sold same in January, 1921, for £195, and bought a second-hand Swift, 10 h.p. Coupé, for £295; this he sold in August, 1921, for £235, and bought a new Lagonda, 11 h.p. Coupé, for £450.

*** We are of opinion that a proper claim would be as follows:

January, 1921, £295—£195	= £100
August, 1921, £295—£235	= £ 60
	£160

If "Junior Partner" can ascertain definitely how much extra he is paying for the privilege of spreading his total payments over five years on the hire-purchase system, we consider that he is entitled to charge one-fifth of that sum in each of the five years as a professional expense.

"JAY-TEE" is employed as a county council school medical inspector; he has recently incurred expense in renewing his car; can he claim an allowance for tax purposes, seeing that his council allows him 7d. per mile for the use of his car?

*** There appears to be no ground for dealing with this expense as a separate item. If our correspondent can show that the council's allowance is insufficient to cover the full cost from year to year of his necessary locomotion expenses he would have a claim to deduct the difference, but to make a specific claim for the renewal is to assume that the 7d. per mile is intended to cover running costs only.

LETTERS, NOTES, ETC.

ASTHMA AND ANAPHYLAXIS.

DR. V. L. FERGUSON (Upper Norwood) sends a note on the etiology of asthma. Many articles, he says, are appearing from time to time on the etiology of asthma and allied disorders. That blessed and comprehensive term, anaphylaxis, has, he continues, been bandied about—but are not all forms of disease manifestations of anaphylaxis to some agent, external or internal, organic or inorganic? Why confine it to a certain set of diseases and a certain set of agents? There has been much talk of cat's hair and horse-dandruff and hen's feathers, yet I make bold to say that in order to discover the cause of every case of asthma tests would have to be carried out—tests with every known kind of matter in the animal, vegetable, and mineral worlds, and we might then be far from the truth. Indeed, what reliance can be placed on any kind of skin tests? An article has been published in the *Practitioner* on "foreign" proteins as causes of asthma, hay-fever, and the like. The next article is headed: "Hay-fever—the Essential Factor." Further inquiry discovers this factor to be a surgical condition, removable by operation! This only helps to convince me that these are hydra-headed diseases which cannot be destroyed at a single blow. There can be no question that the ceremony of numerous skin tests must have a profound effect on a patient's mind, and to this alone may, perhaps, be attributed any success that has attended the inquiry into the specific proteins. It would be interesting to see recorded the instances of failure as well as of success; or is this in line with Bacon's remarks on divinations and dreams: "That that hath given them grace and some credit consisteth in three things: First, that men mark when they hit and never mark when they miss; as they do, generally, also of dreams, etc."?

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 25, 28, 29, and 30 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 26 and 27.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *92*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£ s. d.
Six lines and under	0 9 0
Each additional line	0 1 6
Whole single column (three columns to page) ...	7 10 0
Half single column	3 15 0
Half page	10 0 0
Whole page	20 0 0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.

NINETIETH ANNUAL MEETING
OF THE
British Medical Association.
Held at Glasgow, July, 1922.

PROCEEDINGS OF SECTIONS.

SECTION OF MICROBIOLOGY (INCLUDING BACTERIOLOGY).

ROBERT MACNEIL BUCHANAN, M.B., F.R.F.P.S., President.

PRESIDENT'S OPENING REMARKS.

I ESTEEM it a great honour to have been asked to preside over this Section, and at the same time to have the privilege and pleasure of extending to you a cordial welcome. The city of Glasgow has many traditions for those of us who are its citizens, and we trust that our colleagues from a distance will each and all realize that one of the chief of these traditions is hospitality to sojourners within our gates.

In the directions for the conduct of our meetings the Council has laid a restraining hand on the presidents of Sections and asked them to forgo the delivery of a presidential address. It is an injunction in which I feel sure you will gladly acquiesce, and I will only refer to one or two points which I regard as of some interest in connexion with the origin of our Section and with the programme of its work.

In the thirty-four years since the British Medical Association held its annual conference in this city our conceptions of micro-organisms and the part they play in health and disease have undergone many developments. In that brief space of time microbiological science in its onward progress has exercised a profound influence in the realm of human, animal, and vegetable disease, explaining morbid processes, clarifying diagnosis, rationalizing treatment, and directing preventive measures; while in the realm of Nature it has revolutionized our ideas of the processes underlying growth and decay. Its place in our educational system has also become established, and each of our universities and medical and technical schools has a chair or lectureship devoted to its teaching, and almost all nations of the world have striven with each other in friendly rivalry in founding institutes devoted to its advancement by research.

Its early beginnings, which will be recalled by many present, may be likened to the waters that issued from under the threshold of the temple and that swelled with almost incredible rapidity to a mighty river bearing a tide of healing, enlightenment, and new hope. In keeping with this general advance and broadening out of the science, the executive has seen fit to introduce for the first time in the history of the Association a Section of Microbiology (including Bacteriology), with the view of bringing together in helpful conference workers in allied fields of research. The processes of human disease, whether of bacterial or protozoal origin, receive helpful elucidation from the study of kindred processes in animals and plants, while our veterinary and botanical colleagues, on the other hand, derive benefit in their researches from the work done in the realm of human medicine. It is of very special interest to us to recall that we are thus realizing a suggestion made by Sir Clifford Allbutt in his address in medicine on the occasion of the Association's last visit to Glasgow a generation ago.

Having this object in view, the programme of our Section has been designed to embrace phases of microbiology showing the intimate relationship which exists between its various branches and how they hang together in evolving our common stock of knowledge. Investigations in the past have been mainly concerned with what may be termed for convenience the macro-microbic, while in the last few years attention has been largely focused on what may for contrast be designated the micro-microbic or filter-passing micro-organisms. It is not a little remarkable, and may be construed as a reflex of the scientific thought of the time, that three of the discussions in our programme deal more or less directly with the evidences of this realm of microbic life and activity.

We are privileged in having with us at this meeting pioneers in the field of bacteriolysis—Dr. Twort of the Brown Institution, and Dr. d'Herelle of the Pasteur Institute—and our indebtedness to them is very great, in that they have accepted our invitation to discuss a problem weighted with so much interest and significance in the elucidation of the biology of bacteria, and one destined to give a new and more intimate meaning to the pathogenic action of individual species.

The bacteriology of influenza cannot fail to make a strong appeal to every one of us. It has been said that what is least understood is most feared, and such a truism may be very aptly applied to influenza. But I am able to assure you that much light will be let in upon this dark problem by the researches which Dr. Mervyn Gordon, of St. Bartholomew's Hospital, will lay before us.

On what may be called the comparative side of our programme Professor Blackman, of the Imperial College of Science and Technology, will deal with some similarities and dissimilarities between plant and animal diseases. The inclusion of this side of microbiology is a wholesome evidence of the broadening influences at work in bacteriology and parasitology, and which we confidently anticipate will illustrate the advantages of a closer collaboration between the microbiologists engaged in fields of work different, it may be, in materials, but identical in principles.

A subject of great interest to microbiologists—namely, the mutation of species—also finds a place in the programme on the day set apart for comparative work, and we are indebted to Dr. Brierley of Rothamsted for undertaking from his wide experience to open a discussion on this theme.

We will have presented to us interesting papers dealing with food poisoning and dysentery, by Drs. Wiseman and Robertson respectively, and with the intimate structure of the bacterial cell by Professor Ellis. An account of a brilliant piece of work done, one may say, in the African jungle, in elucidating the life-history of *Loa loa*, will be communicated by Dr. Andrew Connal.

The demonstrations connected with our Section have been arranged in the zoological laboratory adjoining, and I wish in your name to express our most cordial thanks to Professor Graham Kerr and Dr. Dunkerley for the excellent facilities they have provided for the display of the specimens.

DISCUSSION ON THE BACTERIOPHAGE (BACTERIOLYSIN).

I.—THE NATURE OF BACTERIOPHAGE.

By Dr. F. D'HERELLE.
(From the Pasteur Institute, Paris.

LET us record first, in a few words, the essential facts relating to the present discussion.

There exist in the intestinal contents of all living beings principles which have the property of dissolving certain bacteria. These principles pass porcelain filters; hence it is possible to separate them from intestinal bacteria.

Each filtering principle, isolated from intestinal contents of normal individuals, dissolves a certain number of bacterial species, belonging generally to the coli-typhoid-dysentery group. The action, therefore, of these principles is not strictly specific; but belongs, for a given filtrate, to a certain number of microbial species. In convalescents from an infectious disease a principle endowed with an energetic dissolving action on the bacterial species which causes the disease is always met with.

It is not only towards the intestinal bacteria that these lytic principles exist: for instance, one can isolate from the excreta of convalescents from bubonic plague a principle which dissolves *B. pestis*; the same phenomenon exists in various animal septicaemias.

I cannot enter here into an examination of all the facts relating to bacteriophage,[1] facts most of which have been already confirmed by the investigations of other workers. But if the facts themselves have not been contested, it is not so in regard to the hypothesis which I have put forward to explain the nature of the principle which brings about the dissolution of bacteria.

A preliminary remark presents itself. Many authors who have formulated hypotheses as to the nature of the lytic principle have simply taken a particular fact supporting their own point of view and have neglected the whole assembly of experimental facts which renders such a thesis untenable, thereby forgetting that experiment is the final criterion of the truth of a theory. Let us try to resolve the question objectively.

The choice between the different hypotheses *a priori* possible to explain the origin of the lytic principle can only be made in accordance with a fundamental rule of logic—namely, in order that a hypothesis becomes admissible it is necessary that it should explain all the experimental facts and that it is not contradicted by any of them; further, in order that this admissible hypothesis may be considered as being in conformity with the nature of things, it must be proved that all the experimental facts cannot be explained if one abandons or modifies this hypothesis.

The bacteriolysis produced under the influence of the principle which we have named "bacteriophage" consists in a total dissolution of the microbial body; at the end of this action there remains no visible residue. A total dissolution of a microbial substance can only be due to a transformation or decomposition of the proteins of the microbe by proteolytic enzymes. Whence, it may be asked, come these proteolytic enzymes? Four hypotheses may be considered.

1. The enzymes may be derived from the animal organism which is attacked by the given bacteria. The enzymes would then be the result of a defensive reaction on the part of the organism.

This is the hypothesis of Kabeshima, Bordet and Ciuca, and Ann Kuttner. Kabeshima[2] does not specify the particular tissue of the animal from which the enzymes originate; Bordet and Ciuca[3] indicate the leucocytes; Ann Kuttner[4] incriminates any tissue.

2. The enzymes may come from intestinal bacteria as the result of a microbial antagonism. For instance, one knows the bacteriolytic action of filtrates of old cultures of *B. pyocyaneus*.

This is the hypothesis of Lisbonne et Carrère,[5] for whom the lytic enzymes are secreted by intestinal bacilli such as *B. coli*, *B. proteus*, etc.

3. The enzymes may be secreted by the bacterium itself which undergoes the lysis. These enzymes would therefore be autolysins.

This is the hypothesis of Weinberg and Aznar.[6] Under the action of a cause *x* the bacteria would acquire the property of secreting autolytic enzymes.

Bail[7] had already indicated a similar origin, but his hypothesis was more complicated, and that in order to harmonize his conception with certain experimental facts to which we shall refer later. The bacteria undergoing lysis would become fragmented into filtrable corpuscles (the "splitters" hypothesis of Bail). These corpuscles would secrete enzymes capable of dissolving the bacteria from which they spring.

With the same view, Otto and Winkler[8] have put forward a hypothesis closely related to that of Bail, but for them the question resolved itself into one of bacterial albuminoid micelles, which do not reproduce themselves, but which secrete the lytic enzymes.

4. The enzymes may be secreted by an ultramicroscopic virus, which is a parasite of bacteria. This is the hypothesis by which I have held since my first publication.[9]

These four hypotheses cover all the possibilities. Let us now see which hypothesis conforms best with the experimental facts, at the same time eliminating those which fail to do so.

FIRST FACT: *The dissolution of bacteria under the influence of the bacteriophagic principle takes place in series.*

That is to say, a filtrate containing the bacteriophagic principle, when added to a culture in liquid medium of a bacterium towards which the principle manifests its lytic action, provokes the entire dissolution of the bacteria. A trace of the latter, inoculated into a second bacterial culture, leads to the latter in its turn undergoing total lysis. A trace of this second dissolved culture, inoculated into a third bacterial culture, produces the same phenomenon, and so on *ad infinitum*. After more than a thousand passages, the thousandth bacteriolysed culture contains a bacteriophagic principle as active as, and generally much more active than, that of the primitive filtrate.

The phenomenon goes on in series in the same way, whether the culture is inoculated with the previously dissolved non-filtered culture, or with the dissolved culture filtered through a porcelain filter: the filtrate contains the bacteriophagic principle as active as the lysed non-filtered culture.

A simple enzyme action would cease to show itself from the first tubes of the series, because of the greater and greater dilution of the enzyme solution in the course of the successive passages. One calculates easily that at the thousandth passage (each passage being carried out on 10 c.cm. of bacterial emulsion inoculated with 1/1000 c.cm. of the preceding dissolved culture) the titre of the dilution in the thousandth tube of the series is given in cubic kilometres by the number 10^{3982}. To appreciate this incommensurable number it is interesting to note that, at the twenty-second passage only, the drop of primitive filtrate introduced into the first tube of the series finds itself diluted in 10^{70} cubic kilometres of liquid; such a cube of liquid is so great that a light ray would take one billion of years to cross one edge of it. It is impossible to conceive of an enzyme, contained in a single drop of primitive filtrate, still existing, without any diminution of its activity, after being diluted to this extent.

That the action may become manifest, each dilution must be allowed sufficient time (four to six hours) to permit the development of the bacteriophagic principle. On the contrary, when the dilution is utilized immediately, the bacteriophagic action ceases about the fourth or fifth dilution.

These experiments establish clearly that a regeneration of the bacteriophagic principle occurs at each passage. Consequently the lytic enzymes are produced by a living being, which regenerates itself in the course of the successive passages.

It will be obvious, then, that this transmissibility in series eliminates hypotheses 1 and 2. The authors who have put forward these hypotheses must admit that the principle derived from the organism which is attacked by parasites (hypothesis 1), or from the foreign bacteria (hypothesis 2), plays solely the rôle of a transformer—that is to say, it gives rise in the bacteria which undergo the transmissible lysis to a special state of "autolysability." We come now to the third hypothesis. Only Bordet and Ciuca have attempted to give an explanation of this. For them the leucocytic principle would provoke in the bacteria a "hereditary vitiation of nutritional nature." I must say that I do not understand how a filtered liquid can transmit a hereditary property. Besides, the whole theory of Bordet and Ciuca is based on an experience entitled "leucocytic exudates," which I have elsewhere stated it is impossible to repeat—a statement which has not been challenged by Bordet.[10] The result obtained by him in one experiment would appear to be purely accidental.[11]

But it is to no purpose to discuss here, point by point, the different theories; it is sufficient to show that they are contrary to the facts. Hypotheses 1 and 2 being eliminated, there only remain to consider hypotheses 3 and 4.

SECOND FACT: *The lytic enzymes emanate from material corpuscles which traverse filters; these corpuscles multiply in the course of the bacteriolysis.*

EXPERIMENT A.

In a well-developed bacterial culture, showing a marked turbidity, let us add a small quantity (say 1/10,000,000 c.cm.) of a filtrate containing the bacteriophagic principle, shake, withdraw 1/20 c.cm. and spread it over the surface of an agar slope. Thus we spread over the agar a great number of bacteria and a very small quantity of bacteriophagic principle. After incubation (eighteen to twenty-four hours at 37°) we note that the surface of the agar shows a bacterial growth with a certain number of circular bare spaces here and there, where the agar presents no trace of growth. These vacant spaces once formed are unchangeable; they never spread, and they are never invaded by the surrounding culture.

It is the presence of these immutable bare spaces, which are perfectly circular, that characterizes what we have named "bacteriophage." Before concluding that any bacteriolytic phenomenon is bacteriophagic, it becomes necessary to verify if it gives rise to such bare spaces on agar culture. If not, the bacteriolysis is not of bacteriophagic nature.

The number of spaces depends simply on the quantity of filtrate added to the bacterial culture. If into various bacterial emulsions we introduce variable quantities of the filtrate, the number of bare spaces is strictly proportional to the quantity of filtrate added. On the other hand, the number of the bare spaces is independent of the number of bacteria contained in the medium; whether one introduces a given quantity of filtrate into a bacterial emulsion containing one hundred millions or ten billions of bacteria per cubic centimetre, the number of bare spaces on the agar is practically always the same.

The phenomenon of these vacant spaces is only comprehensible on the supposition that the bacteriophagic principle is of corpuscular nature. The following experiments give the proof thereof.

EXPERIMENT B.

Given a filtrate containing the bacteriophagic principle, let us determine its force in the production of bare spaces.

It is well known that to determine the number of living bacteria contained in an emulsion agar plates are inoculated with a dilution of this emulsion; after incubation, the number of colonies which develop multiplied by the titre of the dilution gives the number of bacteria per cubic centimetre of the primitive emulsion. The enumeration of the bacteriophagic corpuscles contained in a filtrate is estimated in exactly the same way. But as the bacteriophage only grows at the expense of living bacteria, we must make the dilutions of the filtrate in a bacterial emulsion. For this we pipette over agar the bacterial emulsion containing a given quantity of filtrate: after incubation we obtain a bacterial layer strewn with circular bare spaces, each of these spaces being a colony of bacteriophage issued from one corpuscle. The number of bare spaces multiplied by the titre of the dilution gives the number of ultramicroscopic bacteriophagic corpuscles contained in 1 c.cm. of the primitive filtrate.

This experiment shows that the behaviour of the bacteriophage is exactly the same as that of any ordinary microbe. But this last develops at the expense of the nutritive substances contained in the medium; the bacteriophage develops at the expense of the bacterial bodies which constitute its nutritive medium. The bare spaces represent places cleared up by the growth of the ultramicroscopic bacteriophagic corpuscles.

EXPERIMENT C.

Now dilute a filtrate so as to obtain a dilution such that 1 c.cm. contains one bacteriophagic corpuscle. Dilute this 1 c.cm. with 9 c.cm. of sterile water, and inoculate ten tubes of bacterial emulsion each with 1 c.cm. It will be obvious that only one of the ten tubes will contain the generator of a bare space; the nine others will not contain any. Place the ten tubes in the incubator at 37° for twenty-four to forty-eight hours; it will be seen that only one of the ten microbial emulsions shows bacteriolysis; the nine others will remain unchanged, the bacteria remain living, normal, and subculturable.

The lytic action, therefore, is complete when only *one* generator of a bare space is introduced into a bacterial emulsion; the action is *nil* in the contrary case. This experiment can only be explained on the supposition that the bacteriophagic principle, the source of the lytic enzymes, is a corpuscle; and that each corpuscle deposited on the agar in the midst of the bacteria gives rise to a colony of these ultramicroscopic corpuscles, such a colony being represented by a bare space.

EXPERIMENT D.

Inoculate a bacterial emulsion with a bacteriophagic filtrate of known corpuscular strength (that is, of known bare spaces forming force); make agar slopes every hour in the same way as in Experiment A. In this way, after six hours, we will have six agar slopes inoculated, and, on incubation, it will be seen that the number of bacteriophagic spaces (each bare space corresponding to a corpuscle) increases in proportion as the lytic action progresses in the emulsion. The maximum number of bare spaces is given when the lysis of the original emulsion is complete; at this moment there are no longer any living bacteria in the emulsion—it is a pure culture of the ultramicroscopic bacteriophagic corpuscles. The bacteriophagic power of such a lysed culture remains at its maximum level during many weeks—it is practically "fixed."

The foregoing experiments show that the lytic enzymes are originated by ultramicroscopic corpuscles which multiply and reproduce themselves. Hence those hypotheses explaining the phenomenon as being due to a *soluble* autolytic enzyme become eliminated.

Of all the hypotheses put forward, only that of Bail, and perhaps that of Otto and Winkler, could not be incompatible with these experiments, since they suppose that the element which secretes the lytic enzymes can be furnished by ultramicroscopic corpuscles, but derived from the bacteria. It is difficult to reconcile these hypotheses with the fact that the bacteriophagic action is not specific, and that the same strain of bacteriophage can dissolve bacteria of different species. Indeed, if one can understand how a principle originated by a species of bacteria can provoke the formation of a similar principle in a culture of the same bacterial species, it is hard to admit how this principle could provoke the formation of the bacteriophagic principle in a culture of a different bacterial species. Besides, these two hypotheses are rendered untenable by the following fact.

THIRD FACT: *All bacteriophagic ultramicroscopic corpuscles, grown at the expense of any bacterial species, constitute one and the same antigen.*

I have up to the present isolated various strains of bacteriophage active towards different bacteria: *B. typhosus*, *B. paratyphosus* A and B, *B. dysenteriae* (Shiga, Flexner, Hiss), *B. coli*, *B. pestis*, *B. proteus*, *B. gallinarum*, bacteria of haemorrhagic septicaemias, staphylococcus, etc.

We have seen above what constitutes a culture of the ultramicroscopic bacteriophagic corpuscles. Inoculate an emulsion of *B. dysenteriae* with a filtrate containing an active bacteriophage towards this bacterium; after a few hours the medium becomes limpid, the bacilli are dissolved, and the bacteriophage corpuscles have multiplied; the culture of the bacteria has become a culture of antidysenteric bacteriophage. Similarly, a culture of *B. pestis* dissolved under the action of the bacteriophagic principle (isolated from the intestinal contents of a convalescent from bubonic plague) becomes a culture of antipestic bacteriophage. And so on for any other microbe.

One knows that the serum of a rabbit prepared by injections of *B. dysenteriae* contains an amboceptor towards *B. dysenteriae*, but does not contain any amboceptor towards any other bacteria—for example, *B. pestis*.

Now prepare a rabbit with a culture of *B. dysenteriae* dissolved by bacteriophagic action; one verifies that its serum does not contain any amboceptor towards normal *B. pestis*, but contains an amboceptor for *B. pestis* dissolved by the action of the bacteriophage. And this is true for no matter what bacterial species; the serum of an animal prepared by a culture of any bacterial species dissolved by bacteriophage contains an amboceptor which fixes itself on any other bacteriophaged culture. Hence the amboceptor is specifically *antibacteriophagic*, and not *antibacterial*. Therefore the bacteriophage is an autonomous antigen, and consequently must be considered, in the present state of knowledge, as a definite ultramicroscopic virus constituted by corpuscles, such a virus being necessarily an ultramicrobe.

Only the hypothesis of a filtrable micro-organism which is an obligatory parasite of bacteria is compatible with the foregoing facts. It now remains to show that this only admissible hypothesis is not contradicted by any experimental fact.

FOURTH FACT: *The ultramicroscopic corpuscles possess a variable virulence.*

We have seen that the above ultramicroscopic organism, which we have designated by the name of "bacteriophage," is constituted by living corpuscles which multiply and which it is possible to count. Now, experience shows that the lytic activity of these corpuscles varies from one strain to another. For instance, certain strains recently isolated from the organism are unable to provoke the dissolution of a bacterial emulsion, and no matter what number of corpuscles are inoculated into this bacterial emulsion, one can only perceive the presence of these bacteriophagic corpuscles by the production of pin-point bare spaces on agar. On the contrary, with very active strains giving on agar large bare spaces (4 to 5 mm. in diameter), the inoculation of one corpuscle is sufficient to provoke a total dissolution of all the bacteria contained in the emulsion. It is easy to prove that this difference in action is due to a difference in the multiplication of the corpuscles inoculated. In the case of feeble strains reproduction is slow; in the case of strong strains it is rapid. The active particle, therefore, is endowed with a variable virulence, the term "virulence" being taken in its real bacteriological sense of "vegetative power *in vivo*." To explain this fact one must consider the active corpuscle as a microbe, because only a microbe possesses a variable virulence from strain to strain. Moreover, an enzyme only acts by its quantity; a microbe by its virulence and its toxicity combined.

FIFTH FACT: *By successive passages, it is possible to increase the virulence of a feeble strain of bacteriophage.*

For instance, inoculate a feeble strain of bacteriophage into a culture of *B. typhosus*; filter the mixture after incubation; introduce a drop of this filtrate into a fresh culture of *B. typhosus*, which is filtered in turn, and so on for a few passages. The virulence is found to increase little by little, and after a certain number of passages the virulence becomes such that a trace of the filtrate is sufficient to provoke the total dissolution of a fresh emulsion of this bacillus. The technique of the exaltation of virulence is really the same as for any microbe: we exalt the virulence of a bacterium for a given animal by serial passages in this animal species; we exalt the virulence of the bacteriophage for a given bacterial species by serial passages in this bacterium. This fact is only compatible with the hypothesis that bacteriophage is a microbial parasite, since adaptation is the prerogative of living beings.

SIXTH FACT: *Experience shows that bacteria attacked by bacteriophage do not remain passive; they defend themselves and are even capable, under certain conditions, of acquiring an immunity towards the parasite.*

This defence of the bacteria manifests itself by a double mechanism: the bacteria surround themselves with a capsule, and secrete "aggressines" capable of paralysing the lytic enzymes of the bacteriophage. Only the hypothesis of bacteriophage being a parasite of bacteria conforms with these facts.

SEVENTH FACT: *The behaviour of bacteriophage towards physical and chemical reagents is that of a living being, and does not agree with that of an enzyme.*

The resistance of bacteriophage to the action of physical and chemical reagents is intermediate between that of the vegetative and the spore forms of ordinary bacteria. The resistance is less than that of certain ultramicrobes, notably that of the tobacco mosaic. It is destroyed at 74°–75° C., but ceases to develop at 43°. Between 43° and 74° it possesses no lytic action. As to the action of the antiseptics, the bacteriophage is killed after twenty-four hours' contact with a 1 per cent. solution of a neutral salt of quinine, after forty-eight hours' contact with 95 per cent. alcohol, and by eight days' contact with glycerin. The last-named liquid is precisely the medium employed for preserving indefinitely an enzyme in soluble form.

EIGHTH FACT: *It is possible to extract the lytic enzymes free from the living bacteriophage micro-organism.*

If to one part of a culture of bacteriophage is added nine parts of absolute alcohol and the mixture left forty-eight hours in contact, a precipitate is obtained which contains bacteriolytic enzymes, while the bacteriophagic germs are killed, which is proved by the failure of transmissibility in series of the phenomenon. One can only understand this fact on the supposition of an ultramicroscopic microbial parasite: the bacteria are dissolved by enzymes secreted by the living ultramicroscopic germs, hence the action in series. In the above experiment the ultramicroscopic germs are killed, while the enzymes already secreted are preserved intact; hence only a lytic action is obtained which is not transmissible in series.

NINTH FACT: *Bacteriophage is capable of adaptation.*

The bacteriophage is very sensitive to the action of acids—much more sensitive than ordinary microbes. It can be accustomed progressively to live in media containing quantities of an acid which would have been destructive beforehand. The same fact is observed with glycerin. Adaptation is a prerogative of living things.

TENTH FACT: *The properties of bacteriophage are essentially variable.*

It is impossible to isolate two strains of bacteriophage which are absolutely identical as to their range of action on different bacterial species, and as to their intensity of action towards each of these bacterial species. For a given strain of bacteriophage one can vary experimentally this intensity. Variability is an essential characteristic of life.

We have seen, first, that of all the possible hypotheses concerning the nature of the bacteriophage, the hypothesis of an ultramicroscopic parasite of bacteria is alone admissible. Moreover, we have just seen that this hypothesis is not contradicted by any of the facts of bacteriophagic phenomena; and, furthermore, all of the facts cannot be explained if this hypothesis is abandoned or modified. It follows logically, therefore, that such a hypothesis becomes a certitude.

Further, I would remark that I do not specify in any way the species to which the ultramicroscopic organism, which I have given the name of *Bacteriophagum intestinale*, belongs; the name simply recalls its characteristic property and the place where it was at first found. Is it a protozoon, a fungus, a bacterium? Does it belong to a kingdom which is neither the vegetable nor the animal—a still simpler form of life than any which we at present know? These are questions which cannot at present be answered. All that we know of it is that it is an ultramicroscopic organism, a filtrable being, parasite of bacteria, endowed with functions of assimilation and reproduction—functions which characterize the living nature of the being which possesses these properties. That is all that experiment actually shows us.*

The foregoing discussion can only apply to the phenomenon of bacteriolysis in series presenting the special characters that I have indicated. This being so, a final question arises—that of the plurality of the serial phenomena.

In 1915 Twort[12] described a bacterial transformation taking place in series, under the influence of a principle which passes through porcelain filters. His researches have been made chiefly with a micrococcus isolated from vaccine. In addition he observed an identical phenomenon with two other bacteria—a large indeterminate bacillus, and a bacillus of the colityphoid group. Twort isolated the active principle in the following manner.

"Some interesting results, however, were obtained with cultivations from glycerinated calf vaccinia. Inoculated agar tubes, after twenty-four hours at 37°, often showed watery-looking areas, and in cultures that grow micrococci it was found that some of these colonies could not be subcultured, but if kept became glassy and transparent. On examination of these glassy areas nothing but minute granules, staining reddish with Giemsa, could be seen."

The transforming principle is contained in this transparent material.

"The transparent material when diluted (one in a million) with water or saline was found to pass the finest porcelain filters with ease, and one drop of the filtrate, pipetted over an agar tube, was sufficient to make that tube unsuitable for the growth of the micrococcus. That is, if the micrococcus was inoculated down the tube as a streak, this would start to grow, but would soon become dotted with transparent points which would rapidly extend over the whole growth. If in an infected tube small areas of micrococci are left—and this usually happens when the micrococcus has grown well before being infected—these areas will start to grow again and extend over the transparent portion. . . ."

According to this description of Twort, it is not a question of a real bacterial dissolution, but a transformation of a normal culture on agar into a glassy and transparent one. This phenomenon is totally different from that produced by *Bacteriophagum intestinale*. Indeed, under the influence of this latter—no matter what bacterial species is dealt with, no matter what virulence, feeble or strong, of the strain of the bacteriophage, operating exactly in the same experimental conditions as Twort—in no circumstances does one observe the formation of transparent material or anything presenting such an appearance.

Pipette over an agar tube a drop of a diluted filtrate containing a bacteriophage active towards staphylococcus; then inoculate this tube as a streak with a pure culture of staphylococcus; after incubation we obtain a surface growth of the organism, which macroscopically, microscopically, and biologically is normal. This normal bacterial culture is strewn here and there with circular clear spaces; in the interior of these spaces the agar is bare, without any visible trace of any material. These bare spaces never spread over the surrounding culture, even after months in the incubator. Furthermore, they never become invaded by the surrounding bacterial culture: once formed, the bare spaces remain immutable. Confusion, therefore, between the phenomenon observed by Twort and the phenomenon provoked by the bacteriophage is in no way possible.

What is the nature of the principle which acts in the phenomenon of bacterial tranformation observed by Twort? From a consideration of the observations made on this phenomenon, and in view of the fact that the lytic agent and the bacteria are destroyed at the same temperature, it is probable that it is derived from the bacterium itself, which is capable of splitting up into fragments. Twort himself favours this view, but further experiments will be necessary to settle this question.

This conclusion, however, does not detract in any way from the interest attaching to the important researches of Twort. One can already see that the phenomenon observed by this author may play an important rôle in the etiology of the so-called filtrable virus diseases, as he indeed seems to have foreseen. On the other hand, the bacteriophage undoubtedly plays a part in the defence of the organism in the course of infectious diseases, as I have shown elsewhere.

* I will mention, in passing, the hypothesis of Salimbeni: the enzymes would be secreted by a myxobacteria, microscopically and even macroscopically visible, given filtrable spores. All the workers who have studied the question have failed to observe this would-be myxobacteria, which besides, according to the description of Salimbeni, presents a mycelium (?). That can only mean an impurity, as I have elsewhere pointed out.

From a survey of the results already arrived at in the domain of scientific investigation, it is easy to foresee that there exists a whole series of phenomena, quite unsuspected a few years ago, whose study should play a large part in the advance of scientific medicine.

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II.—THE BACTERIOPHAGE: THE BREAKING DOWN OF BACTERIA BY ASSOCIATED FILTER-PASSING LYSINS.

By F. W. TWORT, M.R.C.S., L.R.C.P.

(From the Laboratories of the Brown Institution, London.)

THIS phenomenon of bacteriolysis, which in France has been called the "bacteriophage," consists, as you know, of a breaking down and dissolving up of bacteria by a filter-passing material which in certain circumstances may be associated with pure cultures. My first experiments were carried out at the Brown Institution during 1914 and 1915, for the Local Government Board, and the results were published in the *Lancet* (December 4th, 1915) under the title of "An investigation on the nature of ultramicroscopic viruses." The condition, in my opinion, is distinct from the various degenerative changes which have been so often described in bacterial cultures, and it will be unnecessary for me to consider in detail experiments on degenerative changes. It is also impossible in the time at my disposal to discuss every aspect of the subject; moreover, other speakers will no doubt deal with the many interesting experiments which they have carried out. In this paper I propose to give you as shortly as possible my original experiments as they were published in 1915, and I shall pass on to consider certain aspects of the subject which have since become points of controversy between different workers, and shall then deal shortly with certain more recent experiments which I have been doing on the biology of bacteria, as these may throw some light on the use of the lytic material.

When starting the research my object was to discover, if possible, the nature and life-history of the ultramicroscopic group of viruses. The experiments were carried out with these views in my mind: In the first place we do not know for certain the nature of an ultramicroscopic virus. It may be a minute bacterium that will grow only on living material, or it may be a tiny amoeba which, like ordinary amoebae, thrives on living bacteria or animal tissue. On the other hand, it must be remembered that if the living organic world has been built up slowly in accordance with the theories of evolution, then an amoeba and a bacterium must be recognized as highly developed organisms in comparison with much more primitive forms which once existed, and probably still exist, in nature. It is quite possible that an ultramicroscopic virus belongs somewhere in this vast field of life where the organization is lower than that of the bacterium or amoeba. It may be living protoplasm that forms no definite individuals, or an enzyme with power of growth.

In the first instance attempts were made to demonstrate the presence of non-pathogenic filter-passing viruses. As is well known, in the case of ordinary bacteria, for every pathogenic micro-organism discovered many non-pathogenic varieties of the same type have been found in nature, and it seems highly probable that the same rule will be found to hold good in the case of ultramicroscopic viruses. It is difficult, however, to obtain proof of their existence, as pathogenicity is the only definite evidence we have at the present time of the presence of an ultramicroscopic virus. On the other hand, it seems probable that if non-pathogenic varieties exist in nature these should be more easily cultivated than the pathogenic varieties.

The first experiments were carried out with such materials as soil, dung, grass, hay, straw, and with water from ponds. Cultivations were made on a large number of special media and under special conditions. Experiments were also carried out with pathological material obtained from distemper in dogs, from vaccinia, and from various other sources. The first results of interest were obtained with vaccinia. Inoculations were made on to ordinary agar tubes, and on to tubes of special egg media such as I used in my experiments for the cultivation of Johnes's bacillus and the lepra bacilli of man and of rats. It will be impossible to describe all these in detail, but the essential part of one series consists in the incorporation in the media of the dead bodies of certain acid-fast bacilli such as *Bacillus phlei*, which proved to be so successful in the cultivation of Johnes's bacillus. The egg media usually grew a number of colonies of micrococci and diphtheroids, while the agar tubes grew only a few colonies of micrococci. In the case of the egg media it was noted that in a few days certain parts of the micrococcus growth sometimes became dull, and in appearance rather resembled bacterial growth in which amoebae were also growing. On the agar media the colonies of micrococci occasionally showed a translucent or transparent change, which started as more or less clear spots at the margins of the colonies. It was also found that some of these colonies could not be subcultured, but if kept the transparent change extended over most of the colony.

On examination of these glassy areas nothing but minute granules, staining reddish with Giemsa, could be seen. Further experiments showed that if a colony of the white micrococcus that had started to become transparent was plated out instead of being subcultured as a streak, then the micrococcus grew and a pure streak culture from certain of these colonies could be obtained. On the other hand, if the plate cultures (made by inoculating the condensation water of a series of tubes and floating this over the surface of the medium) were left, the colonies, especially in the first dilution, soon started to turn transparent, and the micrococci were replaced by fine granules. This action, unlike an ordinary degenerative process, started from the edge of the colonies; and further experiments showed that when a pure culture of the white or the yellow micrococcus isolated from vaccinia is touched with a small portion of one of the glassy colonies the growth at the point touched soon starts to become transparent or glassy, sometimes killing out all the micrococci and replacing these by fine granules. Experiments showed that the action is more rapid and complete with vigorous growing young cultures than with old ones, and there is very little action on dead cultures or on young cultures that have been killed by heating to 60° C.

Anaerobia does not favour the action, although it appears best in tubes that are capped with gutta-percha tissue. The transparent growth when diluted (one in a million) with water or saline was found to pass the finest porcelain filters (Pasteur-Chamberland F. and B. and Doulton White) with ease, and one drop of the filtrate pipetted over an agar tube was sufficient to make that tube unsuitable for the growth of the micrococcus—that is, if the micrococcus was inoculated down the tube as a streak, this would start to grow, but would soon become dotted with transparent points which would rapidly extend over most of the growth. The number of points from which this starts depends upon the dilution of the transparent material, and in some cases it is so active that the growth is stopped and turned transparent almost directly it starts. This condition or disease of the micrococcus when transmitted to pure cultures of the micrococcus can be conveyed to fresh cultures for an indefinite number of generations; but the transparent material will not grow by itself on any medium.

If in an infected tube small areas of micrococci are left—and this usually happens when the micrococcus has grown well before becoming infected—these areas will start to grow again and extend over the transparent portions, which shows that the action of the transparent material is stopped or hindered in an overgrown tube; but it is not dead, for if a minute portion be transferred to another young culture of the micrococcus it soon starts to dissolve up the micrococci again. Although the transparent material shows no evidence of growth when placed on a fresh agar tube without micrococci, it will retain its power of activity for over six months. It also retains its activity when made into an emulsion and heated to 52° C., but when heated to 60° C. for an hour it appears to be destroyed. It has some action, but very much less on *Staphylococcus aureus* and *albus* isolated from boils of man, and it appears to have no action on members of the *coli*

group or on streptococci, tuberc'e bacilli, yeasts, etc. The transparent material was inoculated into various animals, and was rubbed into the scratched skin of guinea-pigs, rabbits, a calf, a monkey, and a man, but all the results were negative.

When continuing my investigation of infantile diarrhoea and vomiting, for the Local Government Board in 1915, similar experiments were carried out with material obtained from the intestinal tract. After certain difficulties had been overcome it was found that in the upper third of the intestine, which contained numerous bacilli of the colon group, some larger forms were also present. In some cases these grew in far greater number than the ordinary types of bacteria, but this was only so when precautions were taken to eliminate the action of a dissolving substance which infected the colonies so rapidly that they were dissolved before attaining a size visible to the eye. Here, then, was a similar condition to that found in vaccinia, and the greatest difficulty was experienced in obtaining the bacilli free from the transparent dissolving material, so rapidly was the infection increased and carried from one colony to another. At first this bacillus was not believed to be a member of the dysentery-typhoid-coli group, but I have now no doubt that it was a special large form of a member of this group. Unfortunately I lost my cultures during the war before all the characters of the bacillus were completely worked out.

Similar though not such definite results were also obtained with a micrococcus and a member of the coli-typhoid group of bacilli which were obtained from the intestinal mucous membrane of a dog suffering from acute distemper, and I obtained some evidence that the difficulty often experienced in isolating certain known pathogenic micro-organisms might be due to the same cause. In my paper I also pointed out that results similar to those obtained with vaccinia and with bacilli from the intestinal tract would probably be obtained in cases of [true dysentery; but I was unable at the time to investigate dysentery, as my scheme for research on this disease which was submitted to the War Office in 1914 was not accepted. Shortly after the publication of my work, however, I went to Salonica in charge of the base laboratory. While there in 1916 the subject was again discussed on several occasions with the English, French, and Canadian bacteriologists; but at the time the phenomenon was not accepted as one of much importance, and my fresh proposals for continuing the work on dysentery failed to meet with approval. As, however, I had predicted, a similar condition was later found to occur in cultures of true dysentery bacilli, particularly by Dr. d'Herelle, who carried out a series of important experiments on these bacilli. Dr. d'Herelle's published researches appear to me to confirm in the main my own results with micrococci and members of the coliform group of bacilli.

I will now pass on to consider the conclusions I drew from my experiments. In the case of vaccinia it is clear that the transparent material contains an enzyme, and this is destroyed on heating to 60° C. for one hour. It also increases in quantity when placed on an agar tube containing the micrococcus, and this can be carried on indefinitely from generation to generation. If it is part of the micrococcus it may be either a stage in its life history which will not grow on ordinary media but stimulates fresh cultures of the micrococcus to pass into the same stage, or an enzyme secreted by the micrococcus which leads to its own destruction and the production of more enzyme. The fact that the transparent portion cannot be grown except on the micrococcus makes it impossible to obtain any definite evidence on these points. There is this, however, against the idea of a separate form of life: if the white micrococcus is repeatedly plated out a colony from the last plates may give a good white growth for months when subcultured at intervals on fresh tubes; eventually, however, most pure strains show a transparent spot, and from this the transparent material can be obtained once again. Of course, it may be that the micrococcus was never quite free from the transparent material, or this may have passed through the cotton-wool plug and contaminated the micrococcus, but it seems much more probable that the material was produced by the micrococcus. Incidentally, this apparent spontaneous production of a self-destroying material which, when started, increases in quantity, may be of interest in connexion with cancers. In any case, whatever explanation is accepted, I do not think my experiments definitely disproved the possibility of its being an ultramicroscopic virus, because we do not know for certain the nature of such a virus. If the transparent portion were a separate virus, it might be vaccinia, or it might be some contaminating non-pathogenic ultramicroscopic virus, for it is conceivable that whereas a non-pathogenic variety might grow on micrococci or bacilli, a pathogenic variety might grow only in the animal it infects. As the animal experiments were negative, there is no evidence that it is vaccinia, although such a virus might lose its virulence when grown outside the body. On the other hand, no evidence was obtained that it was a non-pathogenic variety. On the whole it seems probable, though by no means certain, that the active lytic material is produced by the micrococcus, and since it leads to its own destruction and can be transmitted to fresh healthy cultures, it might almost be considered as an acute infectious disease of micrococci.

I have now described my original experiments and conclusions, and I will pass on to consider the views of other workers in this field. Where differences of opinion exist the controversy has centred chiefly round the experiments that have been carried out to determine the source and nature of the lytic material. I have already pointed out that when this material is diluted and filtered and pipetted on to a tube of medium just before inoculating the tube with the micro-organism to be lysed, then the action starts at definite points throughout the growth. Dr. d'Herelle obtained a similar result in his experiments with dysentery bacilli, and he considers this a strong point in favour of the view that the lytic material is a separate living micro-organism. I cannot, however, for several reasons, agree that such experiments prove this. First, it is well known, notably in the case of certain starches, that the diastatic enzymes do not in every case dissolve up the grains evenly, but start at certain points, causing pitting and erosion of the grains; at the same time some grains are more susceptible to the enzyme than others. In this case no one has suggested that the unevenness of the action proves the diastatic enzyme to contain a living ultramicroscopic virus. I have noted also with bacteria that not only does the lytic agent attack some members of a culture before it attacks others, but individual members may be pitted and eroded, and particularly is this so with certain large forms of dysentery bacilli which I shall consider later. Again, it is well known in the case of all bacteria that certain members of a culture are more resistant to chemicals and to specific lysins produced in animals, and it may well be that the lytic action on the bacteria starts from a number of distinct points because these points happen to contain specially susceptible micro organisms, and it is only when the action is started and the lytic substance increases in quantity and in concentration that the more resistant members become lysed.

Then there are the very interesting experiments of Professor Bordet and Dr. Ciuca. These workers found that when a lysin was produced by an animal against a coliform bacillus, this lysin not only dissolved up fresh cultures of the coliform bacillus, but the lytic effect could be transmitted from culture to culture. These results certainly do not favour the view that the lytic agent is a definite living micro-organism. Moreover, there are my own original experiments where, after obtaining normal growths of micrococci for a number of generations, eventually some fresh subcultures started to become lysed, apparently spontaneously. But these experiments appear to me to be evidence not only against the view that the lytic material is a definite living organism, but also against the view of Bordet and Ciuca that the lytic agent arises from an association of the bacterium with cells from the animal body. d'Herelle has also obtained the lytic agent by associating bacteria with filtrates of soil, etc., and I agree with him that these experiments do not support Bordet's view, although at the same time I do not think they support the view that the lytic agent is a definite living micro-organism. The apparent spontaneous production of the lytic agent in some of my pure cultures is, I think, evidence against both the views mentioned. It may, of course, be argued, as I mentioned at the time, that my cultures were never really quite free from the lytic agent, but if this view is accepted regarding my repeatedly plated cultures, then it is reasonable to suggest the same regarding the cultures used by d'Herelle and by Bordet.

Recent experiments, in fact, have in no way changed my views, and I repeat my original opinion regarding the lytic agent of the micrococcus—namely, that "the possibility of its being an ultramicroscopic virus has not been definitely disproved," and that "it seems probable, though by no means certain, that the active transparent material is produced by the micrococcus"; and I hold the same view regarding the

lytic agent which various workers and myself have found associated with the dysentery-typhoid-coli group of bacilli.

However, as I have already pointed out, it is just possible that an ultramicroscopic virus may be of the nature of an enzyme, and if so, the original source of such a virus might be the cell it infects: in remote ages possibly a normal enzyme which has gradually developed to take on a pathological action as it has passed through an infinite number of generations of cells, either bacterial, vegetable, or animal, according to its source, and which possesses the power either of directly increasing in quantity or of stimulating the cell to produce more pathological enzyme. On the other hand, it is conceivable that if this lytic agent be a pathological enzyme, it might bear the same relation to the normal enzyme that the cancer cell does to the normal cell. These possibilities may sound very improbable, but at the same time some such explanation would account for the extremely specific nature of many of the ultramicroscopic viruses, and it would certainly explain the absence of visibility and of growth on artificial media. After all, excluding such organisms as the lepto-spirillum of yellow fever, which probably belongs to an entirely different group, there are fundamental differences between the smallest micro-organisms known and the various ultramicroscopic viruses.

Cultivations of the minutest micro-organisms known show all the characteristics of ordinary bacteria. If these are obtained from the soil many of them grow well. On the other hand, if ultramicroscopic viruses are simply more minute members of the group of bacteria, there must be thousands of wild varieties in the soil, and yet no one has succeeded in obtaining a definite growth of a single variety on any solid medium. Minuteness of size might account for their being invisible, but it will not explain the absence of visible growth on artificial solid media. It is true that certain workers at one time claimed to have obtained growths of pathogenic varieties in Noguchi's medium, but in the absence of definite confirmation these experiments need not be considered here.

Professor Bordet and Dr. Ciuca have carried out some most important experiments with the dysentery-typhoid-coli group of bacilli on the specificity of the lytic material, and have obtained results which indicate not only that the lytic agent can be made to break down allied bacilli, but also that certain resisting and otherwise changed strains can be obtained. As I have already mentioned, my micrococcus lysin had little effect on *Staphylococcus aureus*; but I did not carry out many experiments of this nature after obtaining the apparent spontaneous production of the lytic agent in my pure cultures of micrococci, as this result appeared to me to make it difficult to draw definite conclusions from such experiments. Many other workers, but particularly Dr. d'Herelle and Dr. André Gratia, have also carried out important experiments in this branch of the subject, but I must leave other speakers to deal with it, as it is impossible in the space at my disposal to do justice to their work.

There is, however, another aspect of the subject which I should like to mention. As is well known, in pure cultures of such bacilli as dysentery, typhoid, and coli, one sometimes meets with forms which are considerably larger and longer than the average bacillus, and these may be found in pathological material containing these bacilli, being not uncommon in urine in cases of cystitis. Hort and others have described these large forms in considerable detail.

In certain experiments dealing with the lytic material I observed these long forms in greater number than usual, and it was thought that they might in some way be connected with the lytic agent associated with this group of bacilli. There was also the possibility that they might be distinct but symbiotic bacilli growing only with the dysentery or other bacilli forming the culture; they might be mutations, or, again, they might be special forms with special work to do, like bees in a swarm, and, alone or in association with the lytic agent, might prove to be of importance in connexion with the pathogenicity of cultures and the production of immunity in the host.

The work was interrupted by the war, but eventually the results were published in the *British Journal of Experimental Medicine* (October, 1920), and I shall do no more now than consider their possible relation to the lytic agent. In the first place, it must be noted that these large forms occur much more frequently in pathological material than they do in cultures on artificial media. In cases of infantile diarrhoea and vomiting I have found them in large number associated with a lytic agent in the upper part of the intestinal tract, and it is only after the action of the lytic agent is eliminated that they can be easily cultivated. The nature of the bacilli from such conditions is now being investigated.

Most of my experiments were carried out with the Shiga type of dysentery bacillus. The first point of importance to be noted is that the large or "special forms" occur in all pure cultures of bacilli belonging to the dysentery-typhoid-coli group, besides occurring in cultures of the influenza bacillus and other micro-organisms. Further, they are much more numerous in very young cultures than in older ones, and practically disappear in cultures that are twenty-four hours old. I observed also, in cultures that had been growing for six to twelve hours, that these "special forms" were often partially dissolved. From these early experiments I concluded that the bacilli normally produce "special forms," and that these, when presumably of no use to the bacterial community of a pure culture, are dissolved by a lytic agent which is also present, and that this lysin prevents the special forms from multiplying, and interferes with their isolation as growths free from the normal small bacilli. I found, however, two methods by which these "special forms" could be isolated. They may be obtained either by repeatedly plating out on litmus-maltose agar tubes, or by growing in an emulsion of dead coliform, typhoid, or some similar bacillus, and then plating out on the maltose agar medium. Three fairly distinct and stable types were isolated, but it will be unnecessary to consider these in detail. The chief points which I wish to bring to your notice are these: The large bacilli proved to be "special forms" of the bacterium from which they were obtained, and were easily agglutinated by the specific serums. I also obtained some evidence that they were more pathogenic when produced by the normal bacilli than after repeated multiplication by division. When isolated and grown they became more resistant to the lytic agent. In most of the cultures numerous free granules were present, while many of the bacilli contained similar looking granules in the fusiform and round swelling which they presented.

These researches seem to indicate another possible explanation of the lytic action of the substance under review. If this substance is, after all, not pathological to the bacterium, but is a normal product of its activity, then it must be produced for some special purpose which is advantageous to the life of that variety of bacterium. If the "special forms" of bacilli which are found in normal cultures and are so soon dissolved up are produced for the benefit of the bacterial community of a pure culture, then it may be that the lytic agent is formed for the purpose of carrying out this lytic action, and possibly setting free toxins contained in the special forms. Or it may be that it sets free "antitoxins," or substances that will neutralize the toxic substances of the host it infects, or such substances as are produced by other varieties of bacteria with which it struggles for existence when outside the animal body. Probably all bacteria produce substances of a toxic nature, but the possibility of their producing antibodies which will neutralize the toxins of other varieties is one that has interested me for some time. My experiments in this direction lead me to believe that this may be the case, but a research of this nature is rather difficult to carry out technically, and I shall do many more experiments before committing myself to this view. If, however, additional experiments should confirm my opinion, and if the special forms play some part in this process, one can quite understand that the special forms would be useless among the members of a pure culture growing on artificial media. In fact, they might be directly detrimental to the bacterial community, in that they would use up the food supply and overgrow the other bacilli which are necessary for a continuation of the life of that species or variety. In this case the lytic agent would perform a good purpose in getting rid of the useless special forms. It may be argued that this will not explain the lysis of the normal forms of bacilli, but then the conditions of cultivation on artificial media are not those of nature. In fact, in the process of evolution the bacterium did not develop its characters under the influence of cultivation in incubators, and an action that might be restrained to the limits of useful purposes in nature might very well extend beyond those limits under such an abnormal environment as that presented by an uncontaminated tube of agar.

Some of my views and the possibilities I have suggested are no doubt open to criticism, but I claim that the discovery of the filter-passing lytic agent in association with bacteria offers a large field for research, and I suggest that this field

has been further extended by the isolation of "special forms" of bacteria and by the possibility of demonstrating the production of bacterial antitoxins for the neutralization of toxins produced by other varieties of bacteria. Moreover, it must be remembered that all the vital processes of a bacterium have some relation to each other, and it is therefore necessary to study these problems together, or the true significance of any one may not be fully appreciated.

III.—CONCERNING THE THEORIES OF THE SO-CALLED "BACTERIOPHAGE."

By J. BORDET, M.D.,
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[THE following explanatory statement was read by Dr. Gratia for Professor Bordet.]

Through Dr. Gratia I obtained access to the paper Dr. d'Herelle intends to present on the lytic phenomenon due to the so-called "bacteriophage." I was not a little surprised to find that Dr. d'Herelle in this paper attributes to my co-worker, Dr. Ciuca, and to myself, as regards the intimate nature of this phenomenon, an opinion which is wholly different from what we felt entitled to uphold from the very beginning of our studies on the subject.[1] Dr. d'Herelle quotes our names next to Kabeshima's, and enlists us among the authors who assume that the lytic principle is a leucocytic secretion. In fact, this view seems to us altogether untenable, and is almost the reverse of the opinion we have constantly emphasized.

I think we were first to advocate the view that the lytic principle is produced by the microbe itself which shows the lysis—in other words, that the transmissible lysis is in reality an autolysis betraying a nutritive vitiation primarily started by external influences, an example of which may be the contact with a leucocytic exudate. No doubt it would be quite unnecessary to translate literally the many passages of our papers where this assumption is advocated. Some lines, however, may be quoted:

"External influences such as that of a leucocytic exudate modify the bacterium, inducing the latter to elaborate a lytic substance capable of diffusing itself and bringing about the same autolytic phenomenon through successive cultures. When the autolytic process occurs a large number of the microbes present may perish, but some of them, being more resistant, are, during a certain length of time, still capable of reproduction in spite of their producing the active principle, thus imparting to new cultures of the same microbe the same autolytic tendency."

In another paper we add:

"According to d'Herelle, the lysis is due to a living being, to a filtering virus. We, on the contrary, believe that the lytic principle originates from the bacteria themselves, which, when touched by this active substance, are capable of regenerating it, the factor responsible for the phenomenon being thus unceasingly reproduced—on the condition, however, that the bacteria be still living and provided with the alimentary substances necessary to their growth."

I wonder how Dr. d'Herelle could possibly give such an erroneous account of our work as in his paper. The many authors who have written on the subject did not, like Dr. d'Herelle, misinterpret a theory which we have so often and so distinctly outlined and explained. I shall allow myself to quote, for instance, the paper recently published by Dr. Bruynoghe,[2] who writes:

"According to Bordet and Ciuca, the microbes undergo—through the agency of a leucocytic exudate—a modification by which they are henceforth capable of elaborating an autolytic principle, this property being further transmitted to the following generations by the germs which were sufficiently resistant, and thus could multiply. This interesting view permits the understanding of the fact that the lytic principle is only regenerated when the bacteria are living, since the theory asserts that this principle is produced by the bacteria themselves."

I think there is no need to dwell longer on the subject. But one must agree that I could not refrain from correcting d'Herelle as regards our views, nor from presenting them again as they are expressed in all of our papers. The mere titles of these are clear enough; we always designate the phenomenon under the name of "the microbian transmissible autolysis."

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[1] *C.R. Soc. Biologie*, October, 1920. [2] *Le Scalpel*, March, 1922.

IV.—ANDRÉ GRATIA, M.D.,

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1. The Twort phenomenon and the d'Herelle phenomenon are identical. They are two different aspects of one and the same phenomenon: the transmissible lysis of bacteria.

When the "dissolving material" of Twort found in diseased agar cultures of micrococci obtained from vaccinia lymph is transplanted into a young broth culture of staphylococci a dissolution of the latter occurs, and the filtrate of the dissolved culture exhibits all the characteristics of a typical staphylococcus bacteriophage according to the definition of d'Herelle.

On the other hand, typical staphylococcus bacteriophage could be obtained also by other means—namely, by the leucocytic exudate technique of Bordet and Ciuca, or by the puncture of a subcutaneous abscess. When small amounts of this staphylococcus lytic agent are introduced in melted agar which is afterwards slanted and seeded with sensitive staphylococci a culture results, apparently normal at the beginning, but which, a little later, turns into the typical glassy transparent material of Twort. In other words, the Twort phenomenon leads to the d'Herelle phenomenon, and, inversely, the d'Herelle phenomenon leads to the Twort phenomenon.

2. There are no unquestionable proofs that the bacteriophage is a living organism.

The assumption of the bacteriophage being a filtrable virus for bacteria was suggested by two main facts: (*a*) The power of reproduction possessed by the lytic agent, and (*b*) the localization of the lysis to certain round spots of clarification when a very diluted lytic agent is poured over the surface of an agar culture of sensitive bacteria. Although easily explained by the virus theory, yet both facts are not unquestionable proofs of the living nature of the bacteriophage, because they are by no means exclusive features of living beings.

Fire is not living, and yet fire is endowed with power of reproduction. When once lighted, thanks to an initial impulsion such as an electric spark or the mere striking of a match, it can be indefinitely reproduced if fuel is provided. A still more striking, because more biological, example is found in blood coagulation. Suppose a series of test tubes containing a stable plasma—bird's plasma, for instance—which will remain indefinitely fluid. To the first tube we add just a few cubic centimetres of distilled water. As a result of that initial thromboplastic action, which does not need to be repeated in the future, thrombin suddenly appears in the first tube and the plasma clots. If a few drops of the exudate serum in the first tube are pipetted off and poured in the next tube, this second tube clots, in its turn, with a new regeneration of thrombin, which, transferred in the third tube, brings about the coagulation of that tube with again a new production of thrombin, and so on indefinitely. In this way we realize the transmissible coagulation of blood in series, with the continuous regeneration of thrombin, and thrombin is not a living being.

The localization of the lytic action of diluted bacteriophage can be explained by the hypothesis of a chemical substance as well. It must be kept in mind that a culture is not a homogeneous whole, but made up of organisms showing all kinds of qualitative and quantitative individual differences—that is, as far as their susceptibility to the lytic agent is concerned. When a very concentrated lytic agent is poured over the surface of an agar culture an almost complete dissolution occurs, with the exception of just a few organisms resistant enough to overwhelm the strong action of the concentrated lytic agent. On the other hand, when a diluted lytic agent is used only the few extremely sensitive bacteria will be influenced, and each of them becomes a centre of regeneration of the lytic agent, which, diffusing evenly in every direction, produces perfectly round spots of clarification very often surrounded by a kind of halo of diffusion. Between these two extreme conditions all kinds of intermediate degrees exist. Further, any substance, living or not, is composed of particles, molecules, atoms, or ions. When we pour out a glass of soda water, there appear on the wall of the glass small round bubbles of gas, the size of which increases exactly as the so-called colonies of bacteriophage, and yet gas is not a virus.

3. The idea of the bacteriophage being a product of bacterial activity is suggested by the close parallelism existing between the regeneration of the lytic agent on the one hand, and the activity of growth of the bacteria on the other hand.

No regeneration ever occurs in dead cultures, nor in living cultures when put in such conditions that they cannot grow—in saline emulsions of bacteria, for instance, or at low temperature. A slight lysis, with but a small regeneration of lytic agent, is induced in the slow-growing culture of *B. coli* in a synthetic medium. On the contrary, an abundant regeneration occurs in a fast-growing culture in broth. A recently seeded broth culture to which is added just a trace of lytic agent will not be inhibited; but a few hours later, at the very moment the culture reaches its acme of growth, a rapid dissolution occurs with an abundant regeneration of lytic agent.

4. The conception of the bacteriophage being a chemical substance is favoured by the chemical-like affinity existing between a given lytic agent and the corresponding susceptible strain.

I first observed that small amounts of lytic agents lose a certain part of their activity when put together with too thick emulsions of sensitive bacteria. Bordet, with a different technique, could even obtain the complete disappearance of traces of lytic agent in the same condition. Still more convincing are the results of Yaumain and of Da Costa, who observed the absorption of relatively important amount of lytic agent by dead emulsions of the corresponding sensitive bacteria. This specific affinity which is the necessary condition for a lytic agent for inducing the dissolution of a given bacterium is not favourable to the virus theory, because we question how a virus could be definitely fixed by dead bacilli, which, however, it is unable to attack.

5. The bacteriophage is not one and the same antigen. Several lytic agents showing antigenic specificity must be considered.

The *coli* lytic agent can be completely neutralized by proper amounts of corresponding *coli* antilytic serum, but is not at all affected by staphylococcus antilytic serum, which, on the other hand, is only able to neutralize staphylococcus lytic agent and not *coli* lytic agent. This neutralization reaction is thus specific, and demonstrates the plurality of the bacteriophage.

The non-specific results obtained with the alexin fixation reaction and advocated by d'Herelle in favour of the unicity of the bacteriophage, are of no value, because they are vitiated, as can be easily demonstrated, by the presence in the bacteriophage of bacterial dissolution products which have lost their specificity and play therefore the rôle of common antigen between different lytic agents.

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The problem which has exercised the minds of all who have personally investigated the subject has been to elaborate some theory which will adequately explain the facts. Dr. d'Herelle maintains unaltered his originally expressed view that the phenomenon of transmissible lytic effect is fully explained by assuming that a living ultramicroscopic virus parasitizes and brings to solution the particular organisms with which it has most affinity, and that the apparent increase of lytic effect in passage is due simply to growth of the alleged live virus. Even if, as d'Herelle claims, his premisses warrant the conclusion to which he arrives, I should still hesitate in accepting it. I should desire to be satisfied that the alleged cause was a *vera causa* in the sense of the old logicians—that, in fact, it was a cause which did not tax too severely one's sense of the naturalness or likelihood of things. But are the premisses so indubitably established? Is no other general explanation possible? The investigations so far undertaken display an extraordinary variety of experiment, sometimes yielding uniform, sometimes highly conflicting, results, and I feel strongly that, throughout, there has been little attempt to study the phenomena on quantitative lines, with a view to eliminating or evaluating the various known possible factors and agencies that may, either in conjunction or separately, give rise to the end-result. It is possible, however, from the sheer mass of data recorded to take the following facts as presumably established.

1. That certain organisms, particularly those of the intestinal group, submit readily to lysis under the influence of a variety of primary stimuli. These may be filtered faecal extracts from healthy or diseased persons, or they may be extracts of normal tissues or body secretions. Filtrates of these organisms so dissolved are able to carry on the process.

2. That some strains of these same organisms are naturally resistant to these same stimuli.

3. That some strains of these same organisms show lytic changes normally. I attach great importance to this fact. Dr. Lepper, at the Lister Institute, recovered from the urine of a case of pyelitis a coliform strain which behaves in culture as if it were a mixture of bacilli and "bacteriophage." Its growth curve in broth showed repeated depressions, which can be explained only by autolytic effects. On agar the characteristic patchy growth of irregular nibbled colonies appears.

4. That the stimulus if not too strong causes a dissociation of the strain acted upon, into resistant and non-resistant types.

5. That potent lytic extracts can be prepared from the organisms themselves during artificial growth, the process being apparently facilitated by repeated filtration of the growth and reinoculation of the filtrate with the organism concerned.

6. That potent lytic extracts can be obtained from the filtered growth of organisms growing symbiotically.

In whatever way the initial stimulus is obtained the transmission in series can, in my view, be explained only on the assumption that potent autolytic ferments discharged from the lysed organisms are able to initiate similar effects in passage. My own work has been concerned with filtrates of *B. pyocyaneus*, which are known to dissolve readily organisms like *B. anthracis* and *V. cholerae*, but which may fail entirely with certain other species. I have not yet been able to show definite carry-over by ferments from organisms so dissolved, but it is probable that the proper conditions have not been secured. Malfitano, twenty years ago, showed that *B. anthracis* suspended in distilled water liberated autolytic ferments, and he pointed out what is of extreme importance in securing the carrying over—namely, that the organism must be so killed that the ferments discharged are not injured. It is important, therefore, if one wishes to eliminate superfluous factors, to seize on the simplest exposition of the experiment. The simplest exposition so far is, I take it, that in which the organism's own extract can initiate the "bacteriophagic" action. That extracts of organisms may exhibit lytic powers is, of course, no new observation, and it is helpful now to bring these older observations into line with new experiment. The second simple procedure which yields, apparently in a remarkably short time (in a matter of hours, in fact), a potent lytic stimulus is the inoculation of organisms into the circulation of an animal and the demonstration of "bacteriophagic" powers in the serum drawn a few hours later. If the results on this point are confirmed, we seem to have the phenomenon reduced to the simplest form, and it is remarkable that it fits in with certain phenomena the explanation of which has long puzzled us. I may refer, for example, to the extraordinarily rapid development of immunity to plague after inoculation of highly purified plague extracts in rats (Rowland), and to the remarkable though temporary increase of normal antibody which rapidly follows the injection into animals of autolysed bacterial bodies or refined substances like nuclein. I feel that here we have a promising link between "bacteriophage" work and certain previously recorded phenomena.

It is difficult at this stage to evaluate the alleged therapeutic results of these "bacteriophages." There is no doubt, however, that just as *pyocyaneus* filtrates can abort an anthrax infection in rabbits when injected simultaneously with the organism, so a similar local action may well be expected with the filtrates of d'Herelle. It seems to me unlikely, however, that much is to be expected from their therapeutic use in virulent infections in highly susceptible animals. I am not greatly impressed with the evidence of specificity of these "bacteriophages" based on complement fixation tests with immune serum. I take it that, from the work of Otto, Munter, and Winkler, the immune serums obtained by immunization with bacteriophage filtrates is essentially of the same kind, if not of the same order, as those obtained by immunization with the raw organism or its autolysate. Any alleged differences would seem to be due simply to the fact that the bacteriophage filtrates are in a highly refined colloidal state. To this high refinement, which is facilitated by repeated filtration and reinoculations, Otto, Munter, and Winkler attribute the potency of their products as compared with supernatants obtained by the centrifuge only. Just as the anaphylatoxin effect was whittled down to an interaction between two colloids, so I would urge for the investigation by quantitative

methods of the simplest form in which the phenomenon can be elicited. The two main factors in the problem are, to my mind: (1) the variability of bacteria in the matter of susceptibility to lytic change, and (2) the lytic action of extremely finely divided colloidal bacterial protein on susceptible bacteria. From such interaction would result the liberation of autolytic ferments capable of repeating the process in series.

VI.—J. W. McLEOD, O.B.E., M.B.,
Professor of Bacteriology, Leeds.

DR. D'HERELLE in his opening address brought forward some arguments to show that the phenomena which he has described are distinct from those previously described by Dr. Twort. This may be so in a limited sense, and the development of glassy areas in an opaque culture of a micrococcus on the one hand and the transmissible lysis of emulsions of Shiga bacilli on the other, appear to be new and important demonstrations of bacteriolysis by substances derived from the bacteria themselves, or closely associated with them, and in this respect unique phenomena.

The observations, however, on which d'Herelle based his case for proving the existence of an invisible bacterium parasite of the species under investigation—that is to say, the development of bare spaces amidst the growth on an agar slope when the latter was inoculated from a bacterial emulsion to which a small amount of a bacteriolytic filtrate has been added—do not appear to differ essentially from the older results of Eijkman on auto- and hetero-inhibitions in bacterial cultures. The chief points brought out by this worker were:

1. That most, if not all, bacteria produce in the course of their growth substances inhibitory of that growth.
2. That in the case of some bacteria the substances produced act as powerfully, or more so, on other bacterial species.
3. That these substances are thermolabile.

I have been working at intervals since 1918 on this subject of the production of bactericidal substances by bacteria, and I have come to the conclusion that they are diverse. In the case of the thermolabile bactericidal substances produced by pneumococci and many streptococci (studied in collaboration with Mr. Govenlock and Dr. Gordon [1]), which at the outset were thought to be of complex constitution and protein in nature, the quite unexpected conclusion has been reached that the substance responsible is hydrogen peroxide.

The substances inhibiting growth produced by the coliform group of bacteria are certainly different. It is not unreasonable, however, to consider the phenomena brought forward by Mr. Twort and Dr. d'Herelle as special types of the general class of phenomena first carefully investigated by Eijkman, and I believe that a more rapid elucidation of them is likely to be found if they are considered in the light of that worker's results.

Certain observations made in the winter of 1917–18—in some of which I was associated with Dr. A. G. Ritchie—may be of interest in this discussion. These observations dealt with the inhibition of the growth of *B. coli* by filtrates of dysentery cultures in fluid media, and vice versa. The object of the observations was to produce if possible a culture medium exhausted for the growth of *B. coli* but still capable of growing dysentery bacilli. In the course of this investigation it was found that all the coliform bacilli tested grew well in 20 to 25 per cent. dilutions of most samples of Allen and Hanburys' trypsin. The activity of the trypsin was confirmed in each sample. It was observed, however, on one or two occasions that the strain of Shiga's bacillus used grew well, producing frank turbidity in the first twenty-four hours of incubation, but that this turbidity would clear up on further incubation. Another observation was that such media and also tryptic digests of coagulated serums, etc., which were sterile but not inactivated, were those in which *B. coli* most readily produced substances inhibitory to its own growth. Filtrates from such cultures were about equally inhibitory to the growth of Shiga, Flexner or Y dysentery strains, however. With filtrates from growths of dysentery bacilli in such media, however, the results were much more specific—that is, filtrates from cultures of Shiga's bacillus inhibited the growth of Shiga bacilli, but not that of *B. coli* or Flexner's bacillus. Corresponding results were obtained with the other dysentery strains.

An attempt to determine the nature of the inhibitory substance in filtrates of *B. coli* cultures showed that it was not thermolabile but that it was readily thrown out of action by dilution or by addition of alkali. It did not, however, appear to be a matter of degree of acidity, since artificial acidification of culture media to a higher degree did not sensibly interfere with the growth of the bacilli concerned. There is evidence here of the rapid production in suitable fluid media of substances inhibitory to the growth of Shiga bacilli, and it may be that these bacilli when killed by an agent which does not interfere with their internal enzymes, or which may possibly stimulate these, does undergo a rapid autolysis, just as dead tissues in the animal body do. On the other hand, the bactericidal substances demonstrated by Eijkman's technique or modifications of it in ordinary culture media appear to be thermolabile, being at least partially destroyed by short periods of heating at 65° C. in the case of *B. coli* or the dysentery bacilli.

Of all the bacteria which have been investigated by Eijkman's technique Shiga's bacillus is the one most sensitive in its growth to inhibition by many varieties of bacteria.

Of course, it must be admitted that until a more complete explanation of these phenomena has been provided d'Herelle's hypothesis cannot be finally rejected. Inasmuch, however, as he has claimed for his micro-organism two characteristics which are without parallel in bacteriological observation—(1) a heat resistance on the part of the bacteriophagum greater than that demonstrated in connexion with any other ultramicroscopic virus occurring in the animal body, and (2) an organism which grows actively in fluid media without production of turbidity—I find it impossible to accept his theory without much more satisfactory proofs than those which he has advanced.

REFERENCE.
[1] *Journ. of Path. and Bact.*, vol. xxv, 1922, p. 139.

DISCUSSION.

Dr. FLEMING (London) showed some agar plates illustrating the rapid bacteriolysis produced by egg albumen and animal secretions, such as tears. The chief characteristics of these reactions was the rapidity with which they took place, a rich bacterial growth being quickly clarified by the diffusion of the lytic agent.

Dr. A. W. M. ELLIS (London) said: I desire at the outset to associate myself with the remarks of Dr. Gratia and Dr. Ledingham, who have already covered most of the ground on which I had planned to speak. I wish in particular to emphasize Dr. Ledingham's remarks on the necessity of quantitative measurements in working with this phenomenon. In all my work I have employed quantitative methods, the routine being investigation in serial dilutions, the following tubes being set up, the dilution in each being ten times that in the preceding:

10^{-1} 10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7} 10^{-8} 10^{-9}

With an active filtrate complete lysis will always occur up to 10^{-8}—that is, to a dilution of 1 in 100,000,000. In this way I have investigated the effect of variations in temperature, hydrogen ion concentration, suspending fluid employed, etc., upon the reaction; the results will shortly be published in detail.

To-day there are two points to which I would particularly like to draw attention, because I feel that in the solution of their mechanism lies in all probability the key to the nature of the processes involved in the phenomenon. The first is the occurrence of a zone phenomenon, so familiar to workers with colloidal reactions, and especially familiar in the case of immunity reactions, such as complement fixation and precipitation. That is, that the occurrence of lysis is restricted to a certain zone in the scale of dilutions, and that if high concentrations of lysin are employed lysis frequently fails. Thus, in the above-mentioned series of dilutions it is not unusual to find a failure of lysis in the tubes containing 10^{-1} or 10^{-2}, although lysis is complete below this down to 10^{-8}.

The other point is the question of the effect of dispersion of the lysate—that is, the bacterial bodies in the emulsion used. If one takes 10 c.cm. of thick emulsion of Shiga, divides it into equal parts, and adds to each an equal quantity of lysin, and then dilutes one of these equal parts in 1,000 c.cm. of broth, complete lysis will occur in the diluted one, none in the undiluted—that is, the occurrence of lysis

is dependent upon the degree of dispersion of the bacterial suspension.

In these two reactions we see phenomena which remind us at once of the behaviour of colloidal solutions, and it is in the realm of physical chemistry that we should look for a solution of this problem.

To d'Herelle's contention that a living virus is responsible I find myself in complete opposition. Of the arguments produced by d'Herelle in support of his theory, three seem to me particularly pertinent, and I would like for a moment to refer to them in more detail.

1. Colony formation. This, it seems, is readily explainable on the assumption that these points represent the sites of occurrence of highly sensitive organisms. We know the great variation in sensitiveness to lysin that occurs among the organisms of any given culture.

2. The isolation of a single individual. This merely means that the lysin is capable of division into a terminal unit, and that such a terminal unit—that is, single molecule or what not—is capable of initiating the reaction. It is no argument for the living nature of the lytic agent.

3. The effect of alcohol. d'Herelle has claimed that he can by the use of alcohol obtain the lytic products of the lytic agent free from the latter. That is, that after saturation of the lytic filtrate with alcohol he obtains a substance which is lytic, but capable of transmission, not lytic in series. If this is true it is of first rate importance. I have repeated the experiment many times, but always unsuccessfully. If lysis occurs it can always be transmitted in series.

As to the rôles of the lysin in recovery from disease I can only say in conclusion that my experiments have given entirely negative results, and that my own feeling is that it plays no part. My experiments have been with Gaertner's bacillus and infections in mice and have shown only an aggressin action for the lytic filtrate—that is, controls fed with "bacteriophage" prior to infection have died more rapidly than normal controls.

Professor David Ellis (Glasgow) said: When sulphur bacteria have used up all the food supply contained in the cells in the form of sulphur they eventually come to rest, and each filament breaks up into compartments by means of transverse walls. Each cell then begins to swell up and assumes a spherical form and literally disappears. Certain iron bacteria, such as *Crenothrix polyspora*, sometimes multiply with extraordinary rapidity and the whole organism breaks up into minute specks. The circumstantial evidence is very strong that these elements disappear completely.

The President (Dr. Buchanan) summed up the discussion and emphasized the necessity of collaboration between the various departments of biological science in the elucidation of this problem.

Replies.

In his reply Dr. Twort said that there were one or two points to which he would like very briefly to reply. It had been suggested that the bacteriolysin or bacteriophage would only act on very dilute emulsions of bacilli, and not on a thick growth, as is the case with the lysozyme of Flemming. This, however, was not altogether correct, for if a very active bacteriolysin which might be obtained from cocci from vaccinia was transplanted on to the edge of a young vigorous growth of cocci or mixed with the cocci scraped from the surface and transplanted to a fresh tube, then lysis would take place. A suggestion had also been made that the phenomenon of bacteriolysis might possibly be of the nature of a degenerative process and be somewhat similar to the swelling and degeneration observed with the sulphur bacteria. He did not, however, think this was probable, for it was important to remember that the bacteriolytic action was most marked on very young, vigorous growing cultures on good media, which was not what one would expect if it were a degenerative process. Dr. d'Herelle had pointed out what he believed to be differences in the nature of the substances as described by himself (Dr. d'Herelle) and as described by himself (Dr. Twort). Dr. Twort thought that these apparent differences could be accounted for by the slight difference in the technique used and in the undoubted difference in the degree of activity of the lysins in different cases. It also appeared to him that whereas the lytic action might not extend when the micro-organism had overgrown the tube of media and used up all the food supply in his specimens, the same lytic action would naturally extend where a very active lysin was present which prevented the micro-organism from growing sufficiently to use up the whole of the food supply. This explanation was consistent with our knowledge that the lytic substances would only act to any extent when the cultures were actively growing or in a medium suitable for active growth.

In his reply Dr. d'Herelle said it was impossible for him to answer without preparation the new objections put forward against his conception concerning the nature of the bacteriophage; he must in the first place carry out some cross experiments. As soon as they were finished, he would be able to give a formal reply. He wished, however, to make a preliminary remark: he thought the very interesting work of Dr. Fleming constituted a strong argument in favour of his own conception. If the dissolution of the bacteria in the serial phenomenon was due to an enzyme contained in the bacteria, as many bacteriologists believed, this enzyme must be detected in the filtrate obtained from a culture dissolved by the Fleming process. On the contrary, this last phenomenon was not a serial one. It was a proof that the bacteria did not contain in themselves the principle capable of producing the serial lysis. Concerning the rôle of the bacteriophage in immunity, brought up in discussion by Dr. Ellis, he declared that not only did his own experiments show this rôle, but many other authors had made successful experiments on this line. He cited those of Bruynoghe, Gratia, and others in connexion with staphylococcus infections; those of Bekerich and Hauduroy on typhoid; those of Bekerich and Hauduroy, Gorten, Philibert, and others on *coli* infections. In reference to the problem of the similarity or dissimilarity between the principle discovered by Dr. Twort and the bacteriophage, he repeated that the particularities of the two phenomena, as described by Dr. Twort and himself, were very different. It remained to make a close examination concerning the properties of the two principles, such as resistance to the action of physical and chemical agents, as well as to investigate the process of the destruction of the bacteria, etc., for definitively clearing up the question. In any case, the discovery of Dr. Fleming showed that the bacteriolysis could be produced by various different processes. Finally, he said a word about the claim of Professor Bordet. It seemed to him that he had described his conception of the phenomenon quite in the same way as Bordet himself, as it appeared in his own paper. "It will be obvious, then, that this transmissibility in series eliminates hypotheses 1 and 2. The authors who have put forward these hypotheses must admit that the principle derived from the organism which is attacked by parasites . . . plays only the rôle of a transformer—that is to say, it gives rise, in the bacteria which undergo the transmissible lysis, to a special state of 'autolysability.' Only Bordet and Ciuca have attempted to give an explanation of this. For them the leucocytic principle would provoke in the bacteria an hereditary vitiation of nutritional nature." This, he declared, was just the claim of Professor Bordet.

DISCUSSION ON THE BACTERIOLOGY OF INFLUENZA.

(Sir William Leishman, K.C.M.G., C.B., F.R.S., *in the Chair.*)

OPENING PAPERS.

I.—MERVYN H. GORDON, C.M.G., C.B.E., M.D.,

Bacteriologist and Lecturer on Bacteriology, St. Bartholomew's Hospital.

[*With Special Plate.*]

The pandemic of influenza during 1918–19 served to bring home very forcibly the importance of microbiological knowledge, for there is good reason to believe that the severe defeat then suffered by preventive medicine was due in great part to our ignorance with regard to the primary infective agent of this disease. In these circumstances it is clearly the duty of bacteriologists to make all possible use of opportunities that may occur of investigating cases of influenza, and to submit their observations for discussion and criticism at meetings such as the present one. I propose to bring before you some studies made during a recent outbreak, but before doing so will attempt to review the knowledge at present available.

As the differential diagnosis of influenza from purely clinical criteria is necessarily imperfect, it would appear that the best way of approaching the subject from the

bacteriological standpoint is to study not only influenza, but also as many forms as possible of catarrh of the respiratory passages. Because it is characterized at its onset by a condition of profound catarrh, measles also should be included within the purview. Such comparative observations are desirable first in order to gain perspective, and secondly because solution of the etiology of the common forms of catarrh may provide a key to the more virulent disease of this group which we call influenza. Moreover, since over a quarter of the annual mortality in this country is attributable to conditions resulting from infection of the respiratory passages—and perhaps a still larger proportion of the annual illness is due to respiratory infections—the systematic study of the bacteriology of this region is clearly a matter of great importance.

It may here be mentioned that, in view of recent advances in our knowledge, the methods of examining secretion from the upper respiratory passages bacteriologically should include examination of films of the fresh material stained not only by Gram's stain, but also by some specially intensive stain, such as that of Giemsa. For a similar reason cultures on agar enriched with ascites fluid, blood, etc., should be supplemented, when practicable, by diluting a representative specimen of the secretion, or a mixture of such samples, and then, after passing the diluted secretion through a Berkefeld or Chamberland filter, cultivating the filtrate in a medium enriched with fresh tissue, such as the well-known medium of Noguchi.

DESCRIPTION OF SPECIAL PLATE.

FIG. 1.—*Filter passer in culture.* Preparation from a primary culture in Noguchi medium inoculated with filtered nasal secretion at the onset of influenza. The culture was diluted 500 times before making this film. Note the minute size of the organism, its arrangement, and the diplococcal form. Giemsa's stain. (Magnification 1,000.)

FIG. 2.—*Nasal secretion unfiltered.* Nasal secretion at the onset of influenza, showing the filter passer and staphylococcus *in situ*. Giemsa's stain. (Magnification 1,000.)

FIG. 3.—*Vaccinia organism.* Vaccine lymph mixed with staphylococcus. Note the abundance of the organism described by Paschen, and its small size in comparison with the staphylococcus. Loeffler's flagella stain. (Magnification 1,000.)

FIG. 4.—*Nasal secretion* containing catarrhal bacteria. Nasal secretion from a case of subacute catarrh, showing *M. catarrhalis*, pneumococci, and Pfeiffer's bacillus *in situ*. Stain, Gram-fuchsin. (Magnification 1,000.)

FIG. 5.—*Pfeiffer's bacillus* from a culture on blood agar. Stain, Gram-fuchsin. (Magnification 1,000.)

FIG. 6.—*Noguchi cultures* from filtered nasal secretion at the onset of influenza. The right-hand tube shows a cloudiness near the kidney and extending for a limited distance up the tube. The left-hand tube was heated to 55° C. for thirty minutes after inoculation, and has remained unchanged. (Natural size.)

The Bacteriology of Catarrh.

Studies of individual cases, or of outbreaks of catarrh, have shown that a variety of bacteria occur in the respiratory secretions during this condition, among the most common being *M. catarrhalis*, pneumococci, and the diphtheroid organism first described by Cautley, and later renamed by Benham *B. septus*. From time to time also Pfeiffer's bacillus is met with. In the more chronic forms of bronchial catarrh, in addition to the above bacteria, streptococci, Gram-negative bacilli, and even anaerobic organisms of the streptothrix category, may be met with. The precise significance of non-haemolytic streptococci of the *salivarius* or *viridans* class is difficult to assess, because they are so constant and plentiful in normal saliva; but the importance of haemolytic streptococci in some of the more severe and fatal kinds of bronchopneumonia is beyond question. We are much in need of systematic observations on the relative frequency of the more prominent catarrh bacteria in different outbreaks, and especially of the carrier rate of them in communities before, during, and after severe outbreaks.

In addition to the bacteria referred to, evidence is accumulating that in the secretion of the upper respiratory passages during the acute stage of the common cold in the head there occur micro-organisms so minute that they traverse filters which hold up even the very small bacillus of Pfeiffer. It is to these "filter passers" that I wish especially to draw your attention.

General Properties of Filter-passing Micro-organisms.

If anyone makes a list of the infectious diseases and then crosses off those in which the infective agents have been established, he cannot fail to be impressed by the number in which the specific cause has still to be defined. Now the viruses of diseases such as measles, mumps, poliomyelitis, variola, etc., are known to be capable of passing through filters that hold up ordinary bacteria, and this fact indicates that their respective infective agents must be less than 0.5 of a micron in size. Such very minute objects will not be easy to make out even with the highest powers of the microscope, and the term "invisible" or "ultramicroscopic" which has been applied to them would appear to be premature until the possibility of staining them has been explored a good deal farther than appears to have been the case up to the present time. The majority of the filter-passing organisms that have been seen so far seem to bear a close resemblance to one another in size, shape, and arrangement. Thus the minute organisms observed in variola, vaccinia, poliomyelitis, and molluscum contagiosum vary between 0.1 and 0.3 of a micron in size. They are round or oval in shape, occur as single spherical elements or as diplococcal forms, may be grouped in little clusters, and exceptionally are arranged in a short chain. They fail to stain (or stain very feebly) by the staining methods in common use for demonstrating bacteria, and are negative to Gram's stain. From the excellent article of Lipschutz on these organisms it would appear that in order to demonstrate them it is advisable first thoroughly to fix the film in some powerful fixative such as methyl alcohol, osmic acid vapour, sublimate, etc. Next prolonged staining in Giemsa may be employed, followed by careful differentiation in acetone and xylol. Chief success, however, appears to have been obtained by Continental workers with Loeffler's flagella stain; so that, unless Giemsa is used, in order to render these organisms visible the preparation requires (1) fixation, (2) mordanting, and (3) intensive staining by a powerful dye such as freshly prepared hot carbol-fuchsin. A further point to be noted is that when they have been rendered visible by successful fixing and staining, these minute micro-organisms may be found present in the infective material in such enormous numbers that it is advisable to dilute this material as much as a thousand times before making films of it in order to examine individuals. So far these filter-passing organisms do not appear to grow to any extent on ordinary culture media; those of them that have been cultivated grow best under anaerobic conditions in a medium containing a piece of tissue such as Noguchi's medium. Their resistance to heat is comparatively low—they may fail to survive heating for half an hour to 55° C. On the other hand, they withstand glycerination for prolonged periods, and thus differ from the majority of the known pathogenic bacteria.

Von Prowazek has called these filtrable micro-organisms "chlamydozoa," but Lipschutz has suggested the name "strongyloplasma" (*strongylos*, round) for them. From their minuteness, their striking resistance to ordinary stains, and their strictly parasitic character, these micro-organisms are very difficult to investigate. Nevertheless there is reason to believe that progress is gradually being made with regard to their elucidation.

Observations on the Presence of a Filter-passing Virus in Acute Coryza.

The first person to demonstrate the presence of a filter-passing virus in the common cold was Kruse, who in 1914 succeeded in producing colds experimentally by means of a filtrate of the nasal secretion from a case of acute coryza. The nasal secretion was diluted fifteen times in normal saline, passed through a Berkefeld filter, and a few drops of the filtrate instilled into the nostrils of 12 men, 4 of whom developed acute coryza. The experiment was repeated on a larger scale, and out of 36 students into whose nostrils the filtrate was instilled 15 developed coryza within one to four days. Kruse was unable to demonstrate living organisms in this filtrate by ordinary bacteriological methods, and concluded that the common cold is due to a filtrable virus. During the winter of 1915–16 Colonel George Foster of the U.S. Army Medical Corps succeeded in confirming Kruse's observations. In the first place, he was struck by the paucity of ordinary bacteria in the nasal secretion at the *onset* of coryza—an observation with which others agree who have examined the secretion at that stage by the ordinary staining and culture methods. Nasal secretion from 3 cases in the acute stage of coryza was diluted in saline, passed through a

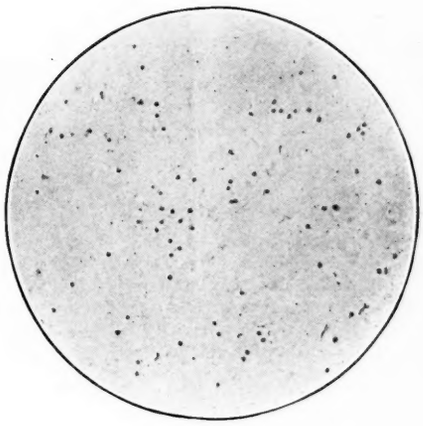


FIG. 1.—Filter passer in culture.

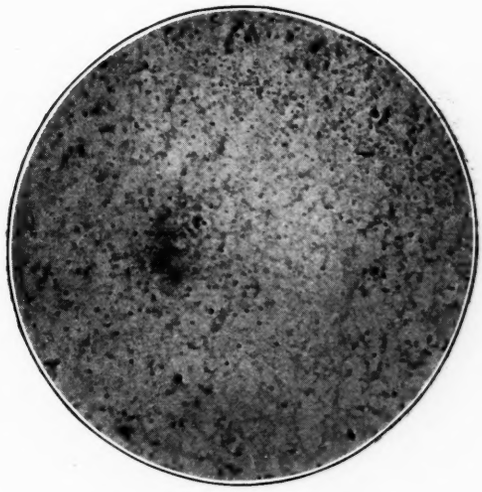


FIG. 2.—Nasal secretion unfiltered.

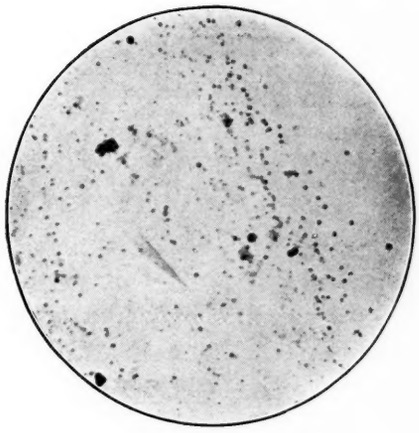


FIG. 3.—Vaccinia organism.

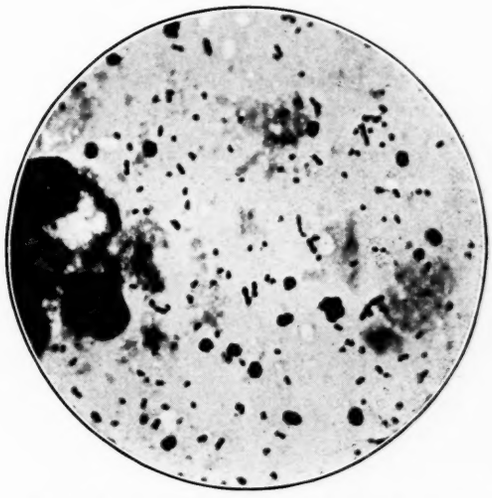


FIG. 4.—Nasal secretion containing catarrh bacteria.

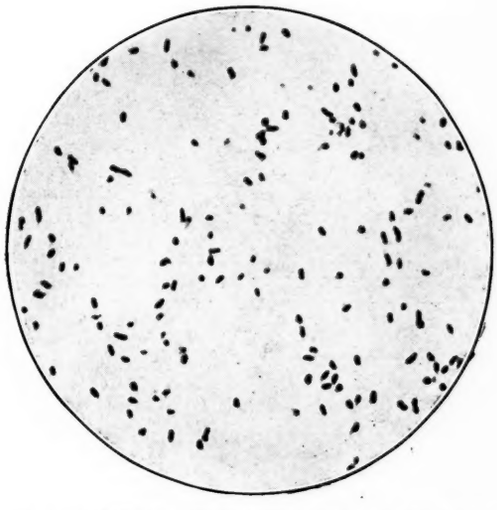


FIG. 5.—Pfeiffer's bacillus, from a cu ture on blood agar.

FIG. 6.—Noguchi cultures from filtered nasal secretion.

Illustrating the paper by C. BENNETT, J. W. S. BLACKLOCK, *and* C. H. BROWNING.

FIG. 1.—From a burn of the third degree on the forearm of a woman, aged 36 (due to paraffin oil), after seventeen days; treated by daily dressing with proflavine 1 in 1,000. Abundant formation of granulation tissue in fat is shown. (× 60.)

FIG. 2.—From a burn of the third degree in a man, aged 37 (due to burning coal); treated with acriflavine 1 in 1,000 for seventy-four days. Well-vascularized granulation tissue is seen; projecting from the surface there are blood vessels, which are filled with red blood corpuscles. (× 60.)

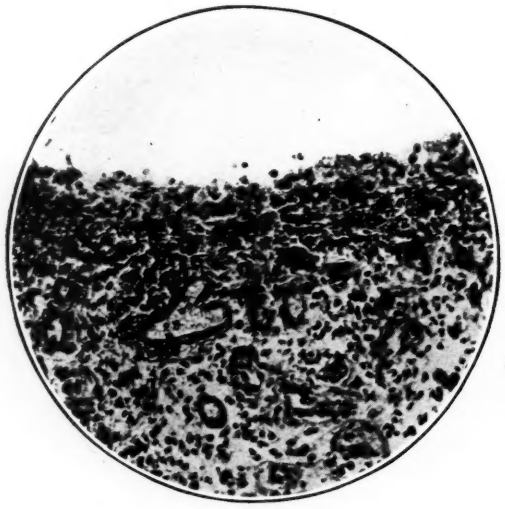


FIG. 3.—From a burn of the third degree on the arm of a girl, aged 12 (due to boiling water); specimen taken after application of proflavine 1 in 1,000 for sixty-four days. The section is stained with haemalum and eosin. Well-vascularized granulation tissue is seen, on the surface of which is a thin layer of cellular exudate, which appears to be necrotic. (× 250.)

FIG. 4.—The same as Fig. 3, but stained with eosin and methylene-blue. By this procedure the polymorphs constituting the layer on the surface of the granulation tissue appear well stained, in contrast to what is seen in Fig. 3. (× 250.)

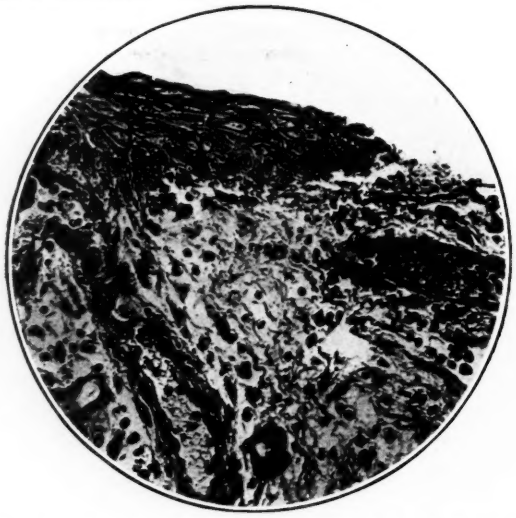


FIG. 5.—From the same case as Fig. 2, showing healing of the skin. The layer of extending epithelium, which is in course of covering the granulation tissue, shows the characteristic thin margin. The surface had been dressed continuously with acriflavine 1 in 1,000 for seventy-four days. (× 250.)

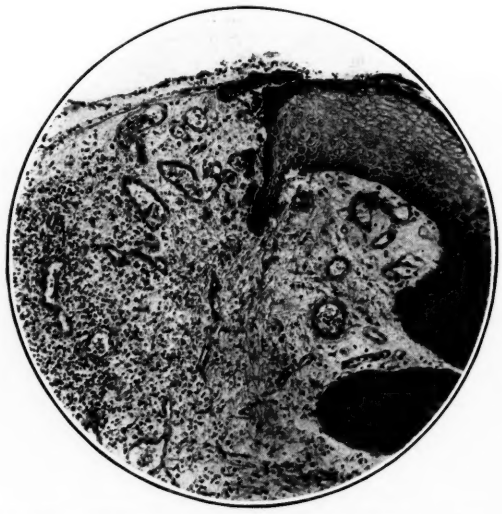
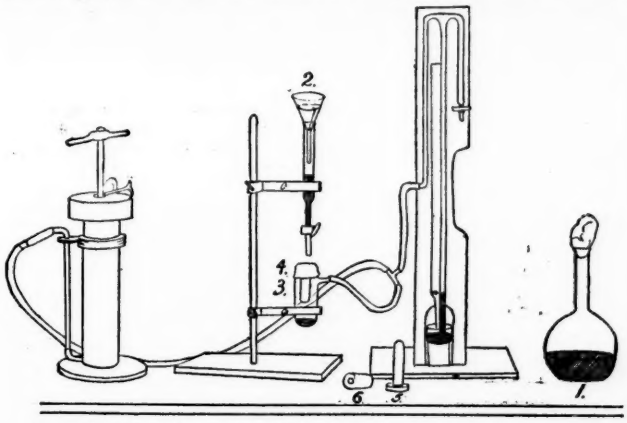


FIG. 6.—Another appearance presented by healing epithelium. From a case of suppurative osteo-periostitis of the femur in a boy aged 8; treatment with carbolic acid packing for two days after operation, thereafter with proflavine 1 in 1,000. Necrotic bone was removed after three weeks; the tissue was taken after application of proflavine for forty-two days. The healing epithelium, which shows a somewhat abrupt edge, had grown over the granulation tissue for three-quarters of an inch, and subsequently healing of the wound continued to progress actively. (× 60.)

Berkefeld filter, and the resulting filtrate found to be sterile when sown on ordinary media. Three to six drops of it, nevertheless, when instilled into the nostrils of 10 healthy soldiers, resulted in 7 of them developing acute coryza within eight to thirty hours. The symptoms were quite typical: the majority developed a profuse rhinorrhoea on the second day, 5 developed a cough, 4 suffered from aching pains in the back or extremities, and in 6 the temperature ranged between 99.2° and 100° F. The duration of the symptoms was from three to six days. The experiment was carefully controlled, and there was no epidemic of colds at the time in the garrison where the experiments were made.

Having found that ordinary bacteriological methods failed to reveal any organisms in the filtrate, Foster proceeded to cultivate it in the tissue-ascites medium of Noguchi. It is to be noted that he devoted eighteen months to mastering the technique of this method, and that he warns investigators that for success the greatest patience and care are needed —a warning I can heartily endorse. In the outcome Foster succeeded in cultivating from the filtrate of the nasal secretion during the acute stage of coryza a minute organism which he describes as consisting of coccoid bodies 0.2 to 0.3 micron in diameter, arranged singly, in pairs and groups, and bearing a resemblance to the so-called globoid bodies found by Flexner and Noguchi in similar cultures from poliomyelitis material.



Apparatus for filtering. 1, Flask with saline gargle; 2, paper filter; 3, Berkefeld filter of shape shown in 5, held in position by rubber cap, 4 and 6. The receiver of the Berkefeld filter is connected to a manometer and air pump. A minus pressure of 10 cm. of mercury is ample.

A dilution of these positive cultures was passed by Foster through a Berkefeld filter and the filtrate instilled into the nostrils of 11 volunteers, 10 of whom, after an incubation period corresponding with that of the first series, developed symptoms of coryza that persisted for several days. The nasal secretion of this second series was filtered in turn, and the organisms recovered from the filtrate by culture in Noguchi medium. Foster concluded that the common cold is infectious; that its virus is present in the nasal secretion; that it is a "filter passer," and is represented in all probability by the minute micro-organism which he succeeded in cultivating. The lack of success of the later attempt by Branham and Hall to cultivate filtrable viruses from cases of colds and influenza may have been due to the fact that most of their material was taken after the second day of the disease; and, to judge from my own experience, it is probable that the ascites fluid used by them, though suitable for hardier organisms, was too alkaline for these exceedingly fastidious micro-organisms.

The Bacteriology of Influenza.

While the toxicity of Pfeiffer's bacillus is generally admitted, and also the important part which it plays in the majority of the severe cases of influenza, there are several points that militate against its candidature for the place of primary infective agent. The first is the significant fact that numerous experiments have been made, especially in America, by infecting human volunteers with Pfeiffer's bacillus without producing influenza. It is true that Blake and Cecil have shown that if the virulence of Pfeiffer's bacillus is raised by animal passage this micro-organism when introduced into the nose of a monkey can produce local and general symptoms and lesions broadly resembling those of influenza; but when Cecil and Steffen repeated this experiment by injecting the nares and pharynx of human volunteers with such a virulent culture, they found that while a condition resembling coryza was produced the symptoms were not quite those of influenza. A further point that tells greatly against Pfeiffer's bacillus is its absence in a proportion of cases of undoubted influenza, and another is the circumstance that bacilli having the morphological and cultural characters of this bacillus may be found in swarms in the bronchial secretion of a considerable proportion of the children who succumb during an attack of measles, the primary agent of which disease is known to be a filter passer.

On the other hand, there is definite experimental evidence that in influenza, as in the common cold, the primary infective agent is a filter passer. During the late epidemic several positive experiments were reported on human volunteers with the filtrate of material derived from cases of influenza, but perhaps the most striking were those of Yamanouchi and his colleagues. These Japanese observers made excellent use of 52 of their colleagues—doctors and nurses—who volunteered for experiment. Sputum from 43 cases of influenza was emulsified and injected into the nose and throat of 12 healthy persons, and the Berkefeld filtrate of the same material was injected in the same way into 12 more. The results were highly significant: 6 of the subjects had recently had influenza and these escaped; all of the remaining 18, after an incubation period of two to three days, developed influenza. A filtrate of blood from influenza patients was injected into the nose and throat of 6 more healthy persons, again with positive result. They next tried the subcutaneous route, using the filtrate of sputum or of blood of patients; all the subjects developed influenza except one, who had previously had the disease. Lastly, a pure culture of Pfeiffer's bacillus and a mixed preparation of the organism of Pfeiffer with pneumococci, streptococci, and other bacteria common in influenzal sputa, were injected into the nose and throat of 14 healthy persons, with the result that no symptoms or illness followed. The Japanese observers point out that in their experiments all persons who had had influenza or who had received the sputa emulsion or its filtrate became immune. These experiments are of great importance. Had an observation been made with the filtrate after heating it for half an hour to 55°C. they would have been still more complete.

Since it is the secondary lesions that kill in influenza, it was to be expected *a priori* that animal experiments to define the primary infective agent would be far less convincing. Thus Andrewes has pointed out that the lesions described by Gibson, Bowman, and Connor in animals that succumbed to inoculation with the filtered material from cases of influenza or from cultures in Noguchi medium are generally similar to those obtained by others with the filtrate of Pfeiffer's bacillus. The filtrate of Pfeiffer's bacillus, however, has been tried on human volunteers by Cecil and Steffen without effect.

The successful efforts of Gibson and others during the pandemic of 1918–19 to obtain cultures of a filter passer from cases of influenza indicated that during the first three days of the disease, but not later, a minute micro-organism similar to that found by Foster in colds is present also in influenza. These observations, however, were not conclusive. Since that time Olitsky and Gates have published a series of observations which have not only confirmed and added precision to those of previous investigators, but also promise to place the matter of the primary infective agent in influenza on a new and firm experimental basis. Starting with the nasopharyngeal washings of cases before the third day of the disease, they showed that this material *unfiltered* produced on intratracheal injection into rabbits a leucopenia falling especially on the lymphocytes, fever, and pulmonary lesions characterized by haemorrhage, emphysema, and oedema. The important point was that Olitsky and Gates were able to transmit this "syndrome" in series, and to carry it on from rabbit to rabbit even for as many as fifteen passages. Controls made in the same way with nasopharyngeal washings from 16 non-influenzal cases, including cases of coryza, also from cases of influenza after the second day, proved negative. Foreign protein (for example, human ascites fluid), *B. influenzae*, or its toxin prepared by Parker's method, all gave negative results. Having thus found that the nasopharyngeal secretion of patients at the onset of influenza has a peculiar pathogenic effect on the rabbit, they proceeded to show that this action is retained by the secretion when the bacteria have been removed from it by a Berkefeld filter. Still using this peculiar rabbit reaction as guide, they next showed that the pathogenic agent present in nasopharyngeal secretion resists 50 per cent. of glycerin for periods up to nine months, and finally that it consists of a minute "bacilloid" body

0.15 to 0.3 micron in length, which they cultivated in Noguchi medium, using ascites fluid having a pH of not over 8, and preferably 7.8.

In papers published during the present year Olitsky and Gates report that they have succeeded in growing the filter passer anaerobically in fluid media containing reducing agents such as ordinary bacteria or vegetable tissue, and also on ordinary agar without further enrichment than 5 per cent. of rabbits' blood. On the latter medium fine colonies are formed within a week and the organism may grow into a spindle-shaped rod as much as a micron in size. Furthermore, by cross-tests they have succeeded in obtaining evidence of the identity of the immunity resulting in the rabbit from injection with the nasopharyngeal secretion of influenza patients, the Berkefeld filtrate of this material, or the filter-passing micro-organism isolated from either of these materials. This immunity appears to endure in the rabbit for at any rate fourteen months. Lastly, they have succeeded in establishing experimentally the formation of specific antibodies such as agglutinin, complement fixing antibodies, and bacteriotropius to this anaerobic filter-passing micro-organism.

PERSONAL OBSERVATIONS.

Early in the present year a sharp outbreak of influenzal illness occurred among the nursing staff of St. Bartholomew's Hospital. I am indebted to Dr. W. P. S. Branson for the following particulars of the epidemic: Between December 23rd, 1921, and January 23rd, 1922, 57 nurses were attacked, the majority between December 25th and January 3rd. The disease was characterized by its sudden onset and by the fact that for the time being it completely incapacitated those affected. The average duration was three days' febrile illness, necessitating a stay of altogether five days in bed and an average absence from duty of seventeen days. Signs and symptoms at the onset were congested conjunctiva and facies, coryza, furred tongue, rapid pulse, and pain in the back. The average highest temperature was 102° F. With regard to complications, these fortunately were rare; one case developed bronchitis that did not pass into pneumonia, and one case of mastoiditis occurred.

The diluted nasal or pharyngeal secretion of 4 nurses within thirty-six hours of the onset of illness was put through the Berkefeld filter, and 1 c cm. amounts of the respective filtrates cultivated in ordinary media and in Noguchi tubes. While the former cultures remained sterile, the latter showed in each case on the fourth to sixth day a "cloudiness" near the piece of kidney, precisely in the manner described by Olitsky and Gates. In each case a control Noguchi tube inoculated with the same amount of filtrate and then heated for thirty minutes to 55° C. remained free of cloud over this period, as also did a control tube of the medium left uninoculated. On examining the positive cultures with Gram's stain no bacteria could be found, and subcultures on ordinary media failed to grow.

When films of material taken from the foot of the positive cultures were fixed in methyl alcohol for twenty-four hours, and then stained in 5 per cent. Giemsa for a similar period and lightly differentiated in equal amounts of acetone and xylol, swarms of minute round bodies, which had for the most part a purple or reddish tint, were revealed (Fig. 1). Having failed to find these bodies in the control tubes, I proceeded to look up the literature of filter-passing micro-organisms, and was much struck by the photographs of those found by Paschen in vaccine lymph, which are included in the review of filter passers by Lipschutz in Kolle and Wassermann's textbook. Having obtained some fresh vaccine lymph through the courtesy of Mr. Fremlin, I proceeded to examine films of it after the manner recommended by Paschen, and after some difficulty succeeded in finding these bodies by using a modification of Loeffler's flagella stain (Fig. 3).

Having come to the conclusion that these bodies in vaccine lymph are of the same order (as regards size, shape, and general appearance) as those present in the influenza cultures, I have since that time been endeavouring to acquire the necessary skill to enable me to investigate these most minute micro-organisms, and I am very conscious of the magnitude of the technical difficulties and of the comparatively slow progress that has been made. Results up to the present time are briefly as follows:

Primary Cultures.—Through the kindness of colleagues, and of the medical departments of the Ministry of Health and the London County Council, I succeeded in obtaining material during the late outbreak of influenza in London from 16 further cases within thirty-six hours of the onset of symptoms, and cultivated the filtrate from each in Noguchi medium as before. Out of the total of 20 cases (including the nurses) in which the filtrate of the nasal or pharyngeal secretion was examined in this way I obtained evidence of the presence of a filter-passing organism in 14. In addition, filtrates from the bronchial secretion were cultivated from three fatal cases of influenza, with positive results in two. The secretion that gave the best growth of the filter passer was literally swarming with Pfeiffer's bacillus; this bacillus, however, failed to pass the Berkefeld filter. In addition to the above cultures I have examined similar material from 7 cases of measles at the onset of the rash. In 3 of these cases the filtrate produced some clouding of the Noguchi tube on the fourth to seventh day, and in two of these cultures I succeeded in satisfying myself of the presence of a filter-passing micro-organism similar in morphology to that found in the influenza cultures. Both these positive cases, however, probably derived the infection from the same strain of virus; and there are clinical grounds for thinking that they were in reality cases of German measles.

Subcultures.—After three weeks' growth three of the primary influenza cultures were diluted, filtered, and the filtrate sown in fresh Noguchi tubes. Two gave a positive growth; in the third the result was doubtful.

Demonstration of the Filter-passing Organism in situ in the Secretion.—As neither Foster nor Olitsky and Gates mention any observations on this point, I have investigated the matter, and in both of the last two cases of influenza have succeeded in demonstrating the minute filter-passing organism in large numbers in the nasal secretion during the first twenty-four hours of the disease (Fig. 2). In both cases the secretion was clear and ordinary bacteria were scarce. The stain used successfully was Giemsa, the stained preparations being differentiated as before in xylol and acetone. Confirmatory results were obtained in both cases with methyl-blue and in the last one with Azur I as well. Both secretions were filtered and found to yield a positive growth of the filter passer on the third to fourth day. The first case developed symptoms of gastric catarrh two days later, but was well again in a few days, and when his nasal secretion was re-examined, eleven days from the onset, no certain filter passers were found either by film or by culture of the nasal secretion.

The morphology of the filter-passing micro-organism from the influenza cases has been referred to previously. I cannot help thinking that the name proposed for this organism by Olitsky and Gates, *Bacterium pneumosintes*, is somewhat premature. The feeling I have is that we are dealing with a new field, so to speak, and that the individual members had better not be given elaborate names until we have agreed upon some common name for the whole group, to which a distinctive name for each member may be added later.

It is, I think, self-evident that the relatively slow progress that has been made with the elucidation of filter passers is due to the fact that these micro-organisms require a technique far more difficult to acquire than that in use for dealing with ordinary bacteria. We are badly in need at present of some simple and fairly quick staining method that will tell us for certain whether these minute organisms are present or not in a given material. For this purpose Loeffler's flagella stain is too complicated, uncertain, and dirty. Giemsa's is far cleaner and less liable to error, but the long time required for fixing and staining is a drawback, and the final differentiation needs the greatest caution or the finest preparation may be ruined. Furthermore, Giemsa's stain may fail occasionally to reveal filter passers, even when these are present in large numbers. Olitsky and Gates use methylene-blue (either polychrome or Loeffler's), but the specimens of methylene-blue I have been able to obtain one and all refuse to stain filter passers. My best results so far have been obtained with a sample of methyl-blue obtained in 1912 from Grubler. It is of course essential to fix these organisms very thoroughly before attempting to stain them. A mixture of equal parts of absolute alcohol, acetone, chloroform, and ether makes a good fixative and seems to clear the ground—a great source of error in this work. After air-dried coverslip preparations have been immersed in this mixture for half an hour I place them in absolute alcohol for the same time, then dry them and place them in 1 to 5 per cent. acetic acid for a few minutes, after which they are left in 1 in 200 to 1 in 400 methyl-blue overnight, either at room temperature or at 37° C. When other methods fail I fix two preparations in the manner stated, then warm one in 1 per cent. acetic acid, the other in 1 per cent. NaOH, and after washing in water and alcohol stain both with hot well-filtered carbol-fuchsin for five to thirty minutes at 55° C. It would seem that the very reluctance of filter-passers to stain with the ordinary bacterial stains can be applied to differentiate them from bacteria. Thus a mixture containing 1 in 5,000 to 1 in 10,000 of ordinary basic fuchsin and 1 in 200 to 1 in 400 of methyl-blue has been found to stain staphylococci a brownish-red colour, and the accompanying filter passer a light blue. It is not every

specimen of methyl-blue, however, that is successful; so that the value of this and other stains for the purpose is a matter urgently calling for investigation.

Search for the primary infective agent in influenza, therefore, has led us into the realm of filter-passing micro-organisms, and is fast tending to place this disease in the same category as measles, variola, poliomyelitis, foot and mouth disease, and many others of this difficult and mysterious group. It would seem that the chief importance of Pfeiffer's bacillus and other catarrh bacteria is in relation to the severity of the disease.

It should be noted that these minute filter-passing organisms are distinguished from albumin precipitates by the uniformity of their size, by the sharpness of their contour, and also by their resistance to caustic potash, acetic acid, ether, chloroform, and trypsin. Further points to bear in mind are the constancy of these organisms in the particular pathological secretions in which they occur, their vast abundance in such materials (corresponding with the high infectivity), and their absence in control materials. Lastly, the evidence that has recently been brought forward by Olitsky and Gates to show that the filter passer of influenza excites the production of specific antibodies is a promising step forward, and is paralleled by the similar claim of Belin and of Paschen in respect of the filter-passing organism of vaccine lymph.

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II.—JAMES McINTOSH, M.D.ABERD.,

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THE etiology of epidemic influenza has been in recent years the subject of much discussion and research, but many difficulties lie in the way of the complete elucidation of the problem. Perhaps the greatest difficulty arises from the fact that influenza is mainly a clinical concept and in all likelihood includes a number of respiratory infections.

Since Pfeiffer, nearly thirty years ago, claimed his *Bacillus influenzae* to be the cause of the disease much research has centred round this bacillus, and two parties have grown up, one of which favours this organism as the etiological agent, while the other considers that the cause is still to be discovered. Many of the latter believe that the virus is ultramicroscopic. The hope that the next great epidemic would decide definitely the part played by *B. influenzae* has not been fulfilled.

I propose here to give a short account of some personal observations on the bacteriology of epidemic influenza made during the late epidemic and forming the basis of a special report to the Medical Research Council.

The first wave of the late epidemic appeared in the early summer of 1918 at a most critical period of the great war, and found the majority of bacteriologists unprepared to tackle the problem. Much useful preliminary information was, however, obtained and greatly facilitated work at a later period. This is particularly true in regard to methods of isolation and cultivation of the bacillus of Pfeiffer. Naturally the majority of bacteriologists first turned their attention to this bacillus, and although the findings were at first conflicting, later they were more uniformly positive. The researches may for the sake of convenience be subdivided into cultural, histological, serological (relating to filter-passing virus), and experimental observations.

1. CULTURAL OBSERVATIONS.

The majority of the observations were made in the epidemic period from July, 1918, to April, 1919, when material from all types of influenza was examined.

Technique.

Film preparations were made and stained by Gram's method and counterstained by neutral red or weak fuchsin, and a rough estimate made of the various types of bacteria present. By this means valuable information was obtained as to the type of bacteria predominating.

For the actual isolation of the bacteria three different media—ordinary agar, serum agar, and Matthew's trypsinized blood media—were used. Matthew's medium has great selective power towards the growth of *B. influenzae*, at the same time inhibiting to a large extent cocci and other bacteria. In each case these three media were used, and after plating out and incubating an estimation of the different colonies was made.

Incidence of Various Bacteria.

As considerable numbers of bacteria are always to be found in any catarrhal condition of the respiratory passages a mere statement of their presence or absence is of little or no value. But by the use of the technique described above a good indication of the type of micro-organism predominating can be arrived at, as the following figures show:

(*a*) *Acute Uncomplicated Cases* (from a local epidemic among the nurses of the London Hospital).—As these cases had practically no bronchial secretion examination by nasopharyngeal swabs was carried out. The number of cases examined was 17; positive 13 = 76.4 per cent.

(*b*) *Acute Influenzal Bronchopneumonia* (sputum examination).—Seventy cases were examined and the following organisms found:

B. influenzae	82.8 per cent.
Pneumococci	31.4 ,,
Streptococci	34.2 ,,
Staphylococci	27.1 ,,
Gram-negative cocci	32.8 ,,

(*c*) *Post-mortem Material* (bronchial secretion and lung juice).—Sixty-eight cases were examined, of which 48 had lesions which were macroscopically characteristic of acute influenza.

B. influenzae	75.0 per cent.
Pneumococci	28.8 ,,
Streptococci	36.6 ,,
Staphylococci	22.2 ,,
Gram-negative cocci	28.8 ,,

A complete differentiation of the pneumococci and streptococci was not possible in this research, but fermentations were always carried out. Blood cultures were sterile unless the cases were *in extremis*, when occasionally streptococci were found. Pus from complicating empyemata contained streptococci or pneumococci, and on two occasions *B. influenzae*.

Observations on a series of cases of gastric influenza indicated that the condition was mainly toxaemic, and only once were definite lesions of an embolic nature found in the intestine *post mortem*.

Incidence of B. influenzae.

B. influenzae, therefore, proved to be the most frequent pathogenic microbe present in the various pathological secretions of acute influenza during the height of the epidemic. In the smaller wave of January, 1922, similar findings as regards the frequency of *B. influenzae* were obtained both in uncomplicated and fatal bronchopneumonic cases.

2. RELATION OF THE VARIOUS MICRO-ORGANISMS TO THE PATHOLOGICAL LESIONS.

Histological examinations of *post-mortem* material showed that epidemic influenza is primarily an acute catarrhal inflammation of the respiratory tract with a maximum involvement of the lungs. Briefly, the characteristic lesion in the latter is a diffuse bronchopneumonia with a haemorrhagic oedema.

At a very early stage bacteria are to be found in considerable numbers in the upper respiratory tract, but are rare in the lungs. Later the lungs contain large numbers. In the mucosa of the trachea and bronchi bacteria were usually found in large numbers in the mucous exudate, on the surface of the mucosa, and deep amongst the epithelial cells. In many cases numerous small Gram-negative bacilli (*B. influenzae*) were found among the unshed epithelial cells. At times cocci of various types, alone or associated with *B. influenzae* types, were found in the exudates and lymph channels of the submucous tissues. The types of bacteria found corresponded closely with the cultural examinations.

3. QUESTION OF A FILTER-PASSING VIRUS.

A search was also made for the presence of a filter-passing virus in acute influenza cases. The filtrates (Berkefeld) of nasal washings, throat washings, and lung juice were inoculated into tubes of Noguchi medium and into a number of

laboratory animals and monkeys. Three of these experiments may be quoted.

1. The filtered nasal washings from two early uncomplicated cases of influenza were inoculated into two *Macacus rhesus* monkeys, four rabbits, and two guinea-pigs.
2. The filtered throat washings from three early cases were inoculated in the same way, but 8 c.cm. was given subcutaneously to a *Macacus rhesus* and a Hussar monkey.
3. The filtered lung juice from three acute fatal cases was inoculated in the same way into a dog-faced monkey (*Macacus rhesus*) and two rabbits.

With one exception all the inoculations were without effect. The exception was the dog-faced monkey; this animal ten days later developed a running at the nose and a temperature of 103·2° F., but an uninoculated monkey in the next cage also had a bad cold. The animal gradually got weaker and died thirty-four days after the inoculation. A necropsy showed accumulations of fluid in the pleural and pericardial sacs. The lungs showed only a few consolidated areas. The spleen was slightly enlarged and showed a number of small yellow areas. Bacteriological and histological examinations showed a recent septicaemia with miliary abscesses. Passage inoculations were without result. I do not consider that in the above instance we were dealing with an infection of an influenzal nature. Similarly, the inoculated Noguchi tubes gave uniformly negative results when injected into animals.

During the recrudescence of January, 1922, I took the opportunity of repeating the search for a filter-passing virus. In this series a number of clinically acute influenza cases of only a few hours' duration were obtained from a large Government department, the average length of illness being only a few hours. The nasopharyngeal secretions were diluted to an adequate extent and filtered through a Berkefeld filter and then inoculated into Noguchi tubes and laboratory animals. A few of the Noguchi tubes developed a diffuse cloudiness; some of these proved sterile, but in others a slow-growing coccus or a small diphtheroid bacillus was found. The majority of the tubes remained sterile to ordinary tests, and with these animal inoculations were negative.

Table of Observations made in January, 1922.

No. 1. H.N.N., aged 15; ill for two hours. Pulse 100, temperature 99.5°.
No. 2. F.D.; ill one hour; rigors, coryza. Temperature 100°, pulse 108.
No. 3. J. J. B., aged 40; ill for twelve hours; rigors, pains in back, etc. Pulse 114, temperature 99°.
No. 4. F.W.; ill one hour. Temperature 100°, pulse 120.

Result of Noguchi Cultures.

1. All tubes remained clear as control; observed fourteen days.
2. Faint turbidity in one tube after forty-eight hours; later found large staphylococcus.
3. All tubes sterile.
4. All tubes showed very faint turbidity in twenty-four hours, which gradually spread up the tube. Subcultures yielded no further opacity and were sterile.

B. influenzae was seen and isolated in Nos. 2 and 4, while very suspicious forms were found in No. 3.

Serological Observations.

Agglutination and complement fixation tests were carried out on the serums of convalescent influenza patients and gave positive readings, chiefly again *B. influenzae* in many cases. In the case of the complement fixation test 12 out of 19, or 63.3 per cent., were positive. Only once definite lesions were found *post mortem*.

Attempts at Experimental Transmission of Epidemic Influenza.

In the section dealing with the search for a filter-passing virus it is noted that animal inoculation with filtered pathological secretion from cases of influenza failed to produce disease in the animals. In order to show that the virus was not held up by the filter a series of similar experiments was made using unfiltered nasal and nasopharyngeal secretions. The injections were made subcutaneously, but without result. Negative results were also obtained on monkeys even when the secretions were instilled directly into the nose. In one case the inoculated nasal secretion was shown to be heavily infected with *B. influenzae*. Similarly the instillation of cotton-wool soaked in pure cultures of *B. influenzae* failed to produce more than a mere transitory secretion of mucus.

Attempts at Producing an Experimental Influenza.

Experiments were carried out to test the pathogenic effects of cultures and filtrates of *B. influenzae* and the production of experimental influenzal lesions.

The failure of all attempts to demonstrate a virus—filter-passing included—which could reproduce an experimental influenza in animals led me to direct my attention again to the part played by *B. influenzae*, which was almost constantly present in the production of the lesions.

It has been known for some time that a number of influenza strains are highly pathogenic for animals, although they fail to produce characteristic influenza lesions in the lungs; the animals, however, *post mortem* show lesions strongly suggestive of the action of a toxin. Again, certain of the symptoms in influenza patients are suggestive of the action of a toxin—collapse, diarrhoea, etc. It was therefore thought advisable to test the effects of filtered and unfiltered cultures for the presence of a soluble toxin. At first not much success was obtained, but later, by using twenty-four hour old cultures in boiled blood broth according to the Parker method, lethal effects could be produced in rabbits and guinea-pigs on intravenous inoculation. In some cases death occurred in a few minutes after the injection; in others partial recovery occurred and the animal died in twenty-four to forty-eight hours, as the following table shows:

	Filtered Culture, Intravenous.	Result.
Experiment I.		
Guinea pig No. 1 ...	2 c.cm.	Died in a few minutes.
Guinea-pig No. 2 ...	2 c.cm.	
Guinea-pig No. 3 ...	1 c.cm.	
Guinea-pig No. 4 ...	0.5 c.cm.	Survived.
Experiment II.		
Guinea-pig No. 1 ...	1.5 c.cm.	Died almost immediately.
Guinea-pig No. 2 ...	1.0 c.cm.	Very ill, found dead next morning.
Guinea-pig No. 3 ...	0.5 c.cm.	Ill, but survived.

A similar result was obtained in rabbits if the dose was increased to 5 to 7 c.cm.

It has been suggested that the toxic effects of these filtrates might be due to an endotoxin or some protein degradation substance instead of a true toxin, although they have many points in common with true toxins and are thermolabile. The crucial test, however, is the production of an antitoxin. By the repeated injection of rabbits a serum was produced which had definite neutralizing properties against the toxin. Normal rabbit serum has only a slight protective power. Unfortunately the complete toxin-antitoxin test broke down, as owing to the relatively large dose of toxin required it was impossible to apply the multiple doses test. With more elaborate technique it is hoped that this may be done at some future date.

Whatever the exact nature of the toxic substances in the filtrates of *B. influenzae* the injection produces histological changes in the animals which bear a striking resemblance to the natural disease. A summary of these is given.

The most suggestive syndrome was observed in guinea-pigs which died four to five hours after the injection. As a rule the animals immediately after the injection became collapsed, the hair stood on end, and they crouched in a corner of the cage. An hour or two later the temperature was found to be subnormal, there was a frothy discharge from the nose, and slight diarrhoea. In the affected animals the pathological changes were often quite striking, particularly in those which died twenty-four to thirty-six hours after the injection. Similar, but less extensive, changes were found in the rabbits. The lungs, as a rule, were voluminous and did not retract fully when the chest was opened. On the surface were to be seen slightly sunken dark red areas of collapse alternating with the pale emphysematous areas. In many definite haemorrhages were seen which at times involved a whole lobe of the lung. On cutting into the lungs, blood-stained frothy mucus escaped in considerable amount.

Microscopically the affected areas showed a typical picture of bronchopneumonia. The bronchioles were plugged with desquamated proliferated epithelium, together with a few leucocytes. There were haemorrhages into the bronchioles, while the bronchial walls and the peribronchial interstitial tissues were infiltrated and contained small haemorrhagic areas. Groups of alveoli were filled with desquamated epithelium and leucocytes. Others contained haemorrhages and coagulated albuminous fluid.

The suprarenals were oedematous and often showed multiple haemorrhages. The kidneys showed varying degrees of parenchymatous degeneration, with actual necrosis of the epithelium in places. The intestines were usually congested, distended with gas, and showing subperitoneal haemorrhages.

In another communication I have dealt fully with the pros and cons of various claims put forward as to what is the true etiological agent of influenza. *B. influenzae* was found in from 60 to 90 per cent. of cases of influenza in the late epidemic, a figure in close agreement with my own results.

The production of experimental influenza lesions in rabbits and guinea-pigs with the toxin of *B. influenzae* (by the Parker method), and the successful results of Cecil and Blake, who produced an experimental influenza in monkeys with virulent strains of *B. influenzae*, go a long way to establish *B. influenzae* as the primary etiological agent. Indirect evidence is the production in susceptible individuals of a typical influenzal attack of short duration by an injection of a vaccine of *B. influenzae*.

Amongst the arguments which have been put forward against the etiological importance of *B. influenzae* may be mentioned the failure to find the bacilli in a certain number of early cases, and the presence of the bacilli in other diseases and in the throats of a number of normal individuals. Time and further research alone can determine whether a filter-passing virus plays an important part in the etiology of the disease. The claims to a successful demonstration of these viruses have been more than counterbalanced by the negative experiments of others. Most of the successful workers claim to have obtained positive cultures in Noguchi medium, in which a cloudiness develops. It is recognized by those who have considerable experience with this medium that these growing opacities are frequently to be observed in uninoculated tubes, while particles demonstrated by prolonged Giemsa staining are to be found in most albuminous fluids. Again, the majority of the best-known filter-passing viruses have not yet been cultivated with certainty and their presence is only recognized by their lethal effects on animals (typhus fever, small-pox, etc.). Considering, therefore, that a number of these filter-passing viruses (Levaditi) are not infrequently to be found in the buccal secretion, any claims as to etiological importance are premature until it has been demonstrated satisfactorily that the virus on injection can produce proliferative changes in the lung such as are found in fatal cases of influenza.

CONCLUSIONS.

1. The predominating micro-organism in the secretions and lesions of the late epidemic was *B. influenzae* (Pfeiffer), which could be demonstrated in from 75 to 80 per cent. of the cases.
2. Other members of the catarrh-producing group of bacteria (pneumococci, streptococci, *M. catarrhalis*, etc.) were much less frequent.
3. Serological examinations confirmed an infection by *B. influenzae*.
4. The possibility of producing, experimentally, influenza-like lesions in the respiratory tract and lungs with filtered cultures of *B. influenzae* was demonstrated.
5. No evidence was obtained in support of the view that influenza is due to a filter-passing virus.

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DISCUSSION.

Dr. J. HENRY DIBLE (Manchester) said that one of the initial difficulties in any work upon influenza was the lack of any definite criterion of this disease. Two distinct conditions, or rather two widely differing extremes in a graduated series of cases, were met with. First, there was the disease as it appeared in the early days of the 1918–19 epidemic—a short pyrexial condition accompanied by sore throat and prostration, but devoid of pulmonary lesions. Secondly, there was the condition so familiar in the later phases of the epidemic when pulmonary lesions were so extremely prevalent. The idea now accepted was that these pulmonary lesions were complications due to other organisms, notably pneumococci and streptococci, acting on lungs damaged by the true virus of influenza. It was preferable to study the uncomplicated form, of which lung lesions were no essential part. The only criterion for the disease under these conditions was the leucopenia, associated especially with a fall in the mononuclear cells, upon which Olitsky and Gates have laid stress in their experimental results. This they claimed to have produced by injection of their filter-passing virus, and considered its production evidence of the relationship of their virus to the clinical disease. Dr. Dible said that he had recently been examining the cellular response to Pfeiffer's bacillus. In all work with this organism it was necessary that the bacillus in question be a certain member of the Pfeiffer group. In examining the throats of normal subjects to ascertain the incidence of Pfeiffer's bacillus a group of organisms had been isolated which belonged to the haemophilic family but not, he considered, to be classed as Pfeiffer's bacillus. The latter was a minute organism, having a restricted ability to split sugars confined to certain monosaccharides. The other group contained large forms and also small organisms closely resembling the influenza bacillus, but they generally showed a much more active power of splitting sugars and a large proportion of them were, in addition, haemolytic. It was possible that some results obtained with organisms believed to belong to the Pfeiffer group might lead to error if the exact properties of the organism in use were not carefully defined. It is found that the intravenous injection of Pfeiffer's bacillus caused a leucocytosis. This infection, however, did not reproduce the conditions of the natural disease, in which the organisms did not invade the blood stream. The injection of small sublethal amounts of the toxins of the organism occasioned, on the other hand, a sharp fall in the leucocyte count, corresponding to the period of collapse and due to a very marked depression of the mononuclear cells. This result was constant and was the condition claimed by Olitsky and Gates to be found with their filter-passing virus and clinical evidence of a condition identical with influenza. Considering the evidence for Pfeiffer's bacillus as a whole, and especially in view of the results obtained by McIntosh with its toxins and the very striking results obtained by Cecil and Blake, who, with a pure culture of *B. influenzae*, were able to produce a catarrhal condition of the upper respiratory passages spreading spontaneously down the air passages and occasioning bronchopneumonic lesions of the lung in monkeys, Dr. Dible was brought to the conclusion that *B. influenzae* (Pfeiffer) could initiate a disease in all ways comparable to human influenza. On the other side of the subject there was a steadily increasing mass of evidence in favour of the filter passer. There were certain rather obvious criticisms which it was perhaps rather unkind to make in view of the great technical difficulties which surrounded this work, but which must nevertheless be realized. In the first place filtration was a crude procedure. A filter consisted of a mass of holes, and it was extremely unlikely that manufacturers could produce them constantly of any degree of uniformity. What would pass through depended upon the relationship of the largest hole in the filter to the smallest piece of viable bacterial tissue present in the culture. The whole matter was very difficult, and it was necessary to standardize technique as far as is possible. It should be a reproach to any scientifically trained worker to talk loosely of Berkefeld filtration without reference to the pressure under which it had been carried out and the time occupied in the process. Three out of four Berkefeld filters he had used passed Pfeiffer's bacillus. Apart from these considerations there were other difficulties. Olitsky and Gates stated that their virus was non-pathogenic for monkeys, whilst Gibson, Bowman, and Connor, who were presumably working with a similar virus, obtained many of their results with these animals. The extraordinarily large amounts of material used to produce the results in Olitsky and Gates's experiments were striking. They used, on an average, a dose of 3 c.cm. of fluid injected intratracheally into rabbits to produce comparatively trivial results. This would correspond to about 120 c.cm. of fluid introduced into the trachea of a 12 st. man, a volume of material which might well produce haemorrhagic lesions. Even with their cultures, in which the virus would be extremely concentrated, they had adhered to this enormous dosage. The results obtained by Cecil and Blake with relatively much smaller doses of Pfeiffer's bacillus were much more impressive. These aspects of the matter should be considered. The problem was still unsolved, and was one of extreme difficulty.

Sir WILLIAM B. LEISHMAN, K.C.M.G., C.B., F.R.S., stated that evidence as to the etiological agent in influenza might be derived indirectly from a study of the results of prophylactic treatment with *B. influenzae* vaccines. The results of the preventive measures carried out by the R.A.M.C. in different parts of the world showed that in some cases no

benefit was derived from a mixed influenza vaccine, whereas in other instances marked protection seemed to have been derived from the vaccination.

Dr. LEDINGHAM said that on the balance of the evidence he had no hesitation in subscribing to the view that the essential cause of influenza is something in the nature of a filtrable virus. Pure uncomplicated influenza, as he had seen it in Mesopotamia in the early epidemic wave of 1918, was a mild infection of two or three days' duration. The presence of Pfeiffer's bacillus in these mild cases was admittedly rare, and this fact could not be ignored simply on the ground that the cultural methods then practised were not satisfactory. Aside from culture the organism was not to be seen in stained smears. On the other hand, no one would deny the importance of Pfeiffer's bacillus as the chief contributory cause of the grave pulmonary complications in the later waves of the epidemic. The bodies described by Dr. Gordon and others in cultures from filtrates were of great interest, but the time was not ripe for judgement upon them. It was necessary to wait until the form and staining properties of protein and other aggregates and precipitates were more thoroughly studied and allowed for in all work of this kind. Even the position of the "globoid" bodies in acute poliomyelitis was still *sub judice*.

Dr. F. W. TWORT said that he had been working on influenza for several years. The evidence for and against the presence of an ultramicroscopic virus had been very ably presented, and he did not desire to say much on that subject. He, however, thought it most important in all filter experiments to determine the exact conditions under which filtration was carried out, as many factors influenced the results. In his own experiments on soil filtrates he had on many occasions grown some very delicate and minute organisms which would pass a Berkefeld filter with comparative ease when they were in a fluid emulsion or had been grown in a fluid medium for a short time; yet they showed no evidence of passage when an emulsion was made from a growth of solid medium and filtered immediately. Another point of interest was that these minute organisms would grow in symbiosis with *B. influenzae* on media containing no blood; this showed that blood was not essential for the cultivation of the influenza bacilli, and, moreover, indicated that the influenza bacilli might survive in such situations as soil, a point that might be of importance in connexion with the start of an outbreak. One other point which might be worthy of note: while he would not suggest that the minute micro-organisms obtained from soil were the ultramicroscopic virus, yet, as such a virus is believed by some workers to be the primary causative agent in influenza, it was, he thought, of interest to find that the influenza bacillus would grow so well and easily when cultivated in symbiosis with these minute soil micro-organisms.

Dr. FLEMING (London) remarked on the diversity of agents which might be responsible for initiating a common cold. He pointed to the frequency with which Pfeiffer's bacillus is encountered in other conditions, and expressed the opinion that there existed many different strains of influenza bacilli.

Lieut.-Colonel F. P. MACKIE, I.M.S., said that the epidemic of influenza in India was widespread and disastrous; millions of people died, whilst in some parts whole villages were wiped out. The reading of bacteriological reports on the subject produced a sense of bewilderment. Bacteriological workers in India had paid special attention to the frequency of Pfeiffer's bacillus and had obtained results similar to those detailed by Dr. McIntosh. The difficulties of working with filter-passing organisms were increased by the instrumental error, particularly the efficiency of filters; the personal factor was also of great importance; the value of the results obtained depended very largely on the technical ability and experience of the worker concerned.

Dr. R. M. BUCHANAN (Glasgow) commented on the marked variability of the conditions known as influenza from a clinical point of view. He recorded an experiment he had performed: a plate of nutrient agar was exposed in front of the mouth of an influenza patient, and Pfeiffer's bacillus, pneumococci, and streptococci all grew in culture. He expressed himself of the opinion that the *Bacillus influenzae* probably played some important part, and that, though the case for the filter passer was strong, it was necessary still to keep an open mind.

Dr. MERVYN GORDON said, in reply, that it was proved conclusively that experimental inoculation with Pfeiffer's bacillus could produce lesions *post mortem* identical with those found in influenza. But was there not some other factor behind it? It was not yet possible to say that the filter passer was the actual cause of influenza, but filter passers ought to be looked for in all cases of common cold and influenza. He explained that he carried out his filtrations under a minus pressure of 10 to 12 cm. of mercury, the operation lasting only five minutes. Small cup-shaped Berkefeld filters worked very well. Undoubtedly a filter-passing organism was present, but what its exact significance was he was not yet in a position to say.

Sir WILLIAM B. LEISHMAN summed up the discussion. He declared that there was a big problem still unsolved; there were many unsatisfactory points about Pfeiffer's bacillus still unexplained. He congratulated Dr. Gordon on the case he had made out for the filter-passing organism, and added that an organized attack on the problem was about to be undertaken by the Medical Research Council, from the filter-passing side, the cultural side, and the chemical side.

SECTION OF PATHOLOGY (HUMAN AND COMPARATIVE).

Professor ROBERT MUIR, M.D., F.R.C.P.Edin., F.R.S., President.

THE ACTION OF FLAVINE ANTISEPTICS ON LOCALIZED PYOGENIC INFECTIONS,

WITH SPECIAL REFERENCE TO THE PROCESSES OF HEALING.*

[*With Special Plate.*]

BY

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So much in the way of prevention of infection has been accomplished by aseptic methods that one is tempted to the conclusion that in dealing with septic conditions, after careful preparation of the operation area, the tissues may be left to combat infection by their own reactive powers. Accordingly it may be judged sufficient merely to protect the parts by means of aseptic dressings from external contamination. Adequate drainage is, of course, the essential requirement in the treatment of all septic conditions, and frequently drainage can be established only by properly directed surgical interference. Consider, for instance, the abscess in appendicitis; when good drainage channels have been made the peritoneum may usually be trusted to deal effectively with the infection. But other parts are much less efficient than the peritoneum in this respect; such is notably the case with the subcutaneous tissues, in which infective processes tend to spread. Here direct attack upon the infective agent by chemical antiseptics is called for. It is reasonable to suppose, and is indeed within the experience of most, that the difficulty of maintaining asepsis on a raw surface is roughly in proportion to the area. Small areas may be neglected, but it is very difficult to maintain a large raw area in a clean state, even if that large area has been produced originally under aseptic conditions. Therefore it is a problem of no small difficulty to combat successfully the infective process on a large area which is already in a septic condition when it comes before the surgeon. As illustrations there are burns, large ulcers, and the areas left after excision of carbuncles. From the treatment of these it is impossible in the present state of knowledge to exclude chemical antiseptics. Every surgeon who deals with large numbers of cases of pyogenic disease has long felt the need of an antiseptic which will fulfil the well-known complementary requirements—namely, maximum effect on organisms and minimum toxic action on body tissues. The powerful antiseptic or "bacteriostatic" property of the compounds of diaminoacridine (flavine antiseptics), together with their relatively low toxicity for mammalian tissues,[2–7] suggested that they might be used

* This work was carried out with the support of the Medical Research Council.

with advantage in the chemotherapy of local pyogenic infections. Opinions in regard to the value of these substances for the prevention of sepsis in contaminated wounds during the late war were practically unanimous,[10 14 15] and their usefulness in this direction points to a much wider application in many branches of surgery than has hitherto been attempted.[11 16] Their beneficial action in combating suppuration which has already become established has also been recorded by numerous observers.[6 8 12 15 16] But as regards their effect on healing observations have ranged from those, for example, of Pilcher and Hull,[13] who found under the influence of flavine "healthy granulating wounds, over which epithelium is growing naturally," to those of Bashford, Hartley, and Morrison,[1] according to whom "the processes differ in no essential feature from the production of an eschar by a destructive agent not liquefying the tissues." It appears, therefore, that further observations are apposite in regard to the influence of the flavines on healing, as observed in the treatment of suppurative conditions in hospital cases in civil practice. The following report records the results obtained in the daily use of flavine antiseptics (acriflavine and proflavine—principally the former) over a period of about four years in a series of over one thousand cases under the care of one of us (C. B.). The cases were of such severity as to necessitate their being treated as in-patients.

It would serve no useful purpose to record statistically the number of days or weeks required for healing in individual cases. No two are alike, and, therefore, were a statement as to duration to be made a very minute description of the disease condition would also have to be supplied. Even then the data would be incomplete if the patient's general state were not also detailed. At best it can only be said that healing occurred within a reasonable time or that it was not unduly prolonged. Accordingly, such statistics are omitted in view of the multiplicity of factors which would complicate their interpretation. Tissue was removed from patients at random and submitted to histological examination, the results of which are recorded below. Obviously specimens could not be obtained in even the majority of cases, but those which were taken represent fairly the average conditions met with in the series.*

Mode of Application.

Believing that the solution must continuously bathe the infected tissues, the simple method was adopted of soaking ordinary sterilized gauze in a 1 in 1,000 solution of the antiseptic in normal saline and, without wringing, applying it dripping to the part. The dressing was always changed before drying took place. In the early stage of treating an infected surface, when it requires to be "cleaned up," as the common phrase is, the dressing must be changed once or even twice daily whatever therapeutic agent be used. A covering of gutta-percha tissue is not therefore necessary, since there is no time for drying. When the necessity for a daily change of dressing has passed gutta-percha should be employed in order to minimize evaporation. Thus protected the dressing may remain unchanged for two or even three days.

Clinical Results.

Before proceeding to discuss the results, the disadvantages attending the use of flavine, which have been recorded by certain workers, will be dealt with. These comprise: (1) encouragement of haemorrhage; (2) the formation of a yellow pellicle on granulating surfaces; (3) delay in healing, which is coincident with pellicle formation; and (4) the occurrence of a rash on the normal skin surrounding a granulating surface.

Encouragement of Haemorrhage (Bashford, Hartley, and Morrison[1]). At no time has important haemorrhage been observed from a raw surface treated with flavine, which could not be fully accounted for by causes other than the antiseptic. Minute haemorrhages from the tips of granulations have frequently been seen; the significance of these will be discussed in the section dealing with burns.

Yellow pellicle (Drummond and McNee[10]) has never been seen. The absence of this phenomenon has also been commented upon by Pilcher and Hull[13] in their large series of war wounds. It would appear that the formation of such a pellicle is encouraged by the drying of flavine dressings on granulating surfaces. On several occasions where drying had occurred it was noticed that the dressing on removal was plastered on its deep surface with the exudate of the granulating wound; this doubtless represents the initial stage of the pellicle. Pilcher and Hull have also attributed pellicle formation to evaporation and consequent concentration of the antiseptic.

*The patient's permission was always obtained before a portion of tissue was removed.

Delay in healing, which is associated with the pellicle, has not occurred in any case. In the case of war wounds treated with flavine, apparently by methods similar to that employed here, varying degrees of inhibition of healing have been noted by different observers. Thus Drummond and McNee,[10] Carslaw and Templeton,[8] and Depage and Maloens[9] have interpreted the onset of a stage of inhibition as the indication that flavine had done its work in preventing or overcoming pyogenic infection and that other treatment should then be resorted to. On the other hand, Bashford, Hartley, and Morrison[1] saw from the use of a 1 in 1,000 solution of flavine "very deleterious effects . . . on the entire process of healing, killing successive layers of the reacting tissue elements, including the essential vascular mechanism. . . . The only favourable feature has been that the patient is apparently protected in some way from the absorption of toxic products." It appears unlikely that differences in the commercial flavine products could account for this variety of results, nor have our biological examinations of many commercial samples supported such an explanation.[5] Owing to the entire absence of such phenomena in the present large series of cases it is impossible to throw much light on the deleterious effects described by Bashford, Hartley, and Morrison. It is possible that war wounds are especially liable to be affected in the manner they describe. But it is clear from the present work, as well as that of Pilcher and Hull,[13] Ligat,[12] and others, that such evil effects must have been due to complicating factors, and that they are not inseparably attached to the use of flavine antiseptics.

Rash similar to that described by Bashford and his co-workers has been seen in three cases. In these there was a rash of small impalpable spots of a deep red colour, which faded on pressure. In two of these it occurred where gauze saturated with flavine solution was covered with gutta-percha tissue, while in the third case there was no impervious covering. In all three cases the rash disappeared in several days when plain dry sterile gauze was used as the dressing; thereafter treatment with flavine was resumed without reappearance of the rash or any other untoward phenomenon.

The total number of cases in which flavine has been used is over 1,000; but all have been excluded from the present statement in which the antiseptic was not brought intimately into contact with the diseased focus—where, in other words, it might be said that the flavine dressing was only used as a receptacle for discharge. For example, when an abscess was opened by a puncture, this case, because of the small extent of diseased tissue in contact with the dressing, was ruled out. All the remaining 656 cases in the following list developed considerable areas of granulation tissue exposed to the dressing fabric and the antiseptic:

Burns	218
Ulcers of leg	14
Carbuncles	13
Cellulitis	96
Osteomyelitis	77
Acute suppurative bursitis	24
Abscesses (various sites)	120
Septic hands	80
Fistula in ano	14
Total	656

Burns.

Only those in which the true skin was involved are considered here. The healing of superficial burns occurs readily. But the cure of those which granulate has attracted much attention in recent years, as is shown by the number of published methods of treatment. During the first ten days, when the extent of tissue destruction is being determined and sloughs are separating, the surface is dressed daily with flavine solution. When obvious granulations develop the dressing in most cases need be changed only every second day. Burns offer an excellent field for observation of the effect of an antiseptic on granulation tissue and on the growing skin-edge. Destruction of the tips of granulations or the sloughing of considerable areas and delay in the advance of epidermis from the margin were the principal complications for which a watch was kept. Granulation tissue under the influence of flavine has without exception remained healthy throughout. So far is flavine from causing granulations to slough, that small spots of fresh bleeding have often been observed when the gauze was newly removed from the raw surface. This is regarded as an indication that the minute vessels are not damaged by flavine, and that therefore there is a perfect circulation of blood in even the most superficial parts. Such slight haemorrhage would, then, be fully accounted for by the injury to the capillaries when the gauze fabric adhering to the granulation tissue was removed. In this respect a striking contrast is presented to the pale, lustreless surface exhibited when such an antiseptic as carbolic acid (1 in 40 or weaker) is employed. The fact that severe haemorrhage is certainly not encouraged, and possibly even controlled, by the application of flavine is well illustrated by the following case: A woman with

extensive burns of the trunk and lower limbs was kept under treatment in her own home for several weeks. During that time several severe haemorrhages occurred from the granulating surfaces, until an alarming loss of blood led to the patient being sent to hospital. There the burns were dressed with acriflavine and there was no recurrence of haemorrhage. Haemostatic effects have been recorded by others (Carslaw and Templeton[8]). There is no delay in the advance of epidermis from the edge; the rate of its growth compares favourably with that under any other form of treatment, as Carslaw and Templeton and others have also observed.

Surfaces for Grafting.

Whether epidermal or whole skin grafts were used it was found that surfaces treated with flavine afforded good ground for their implantation and growth. Any doubt as to the innocuous effects of flavine on the grafts was soon dispelled. It was found that no disadvantage attached to implanting grafts directly on to surfaces in course of treatment with flavine. Thiersch's grafts seem to be quite unaffected by flavine, as has also been noted by Lawson[11] in ophthalmological practice. They have "taken" quickly in almost every case. In the very few instances in which regrafting was required on account of a first failure there was an obvious reason for the result apart from the antiseptic—namely, the situation, at the point of the shoulder, over the sacrum, and over the trochanter. It was found that the pus-like discharge, which appears after a few days on any surface covered with Thiersch's grafts—the natural result of leaving the dressing unchanged in order that the grafts may remain undisturbed—was reduced considerably and in some cases totally prevented by applying a wet dressing of flavine on the top of the perforated protective tissue covering the grafts. Here a very severe test is imposed on the antiseptic when it is allowed to bathe thin shavings of epidermis before they have had time to establish connexion with a new blood supply. Of fifteen cases of grafts actually dressed with flavine fourteen were successful. There were only five cases of whole-skin grafting; the granulating area had been treated with flavine, but the grafts were dressed only with plain sterile gauze. In general, the results were at least as good as in cases which had never been touched by flavine.

Ulcers of Leg.

These were so-called varicose ulcers. Their healing under flavine has been eminently satisfactory. Varicose ulcers in general will, of course, heal under any mild antiseptic treatment if the patient be kept at rest in bed for a sufficiently long time. The need is for a means of shortening that period. With flavine dressings the ulcer develops a clean, bright, red base in from seven to ten days; but in most cases of ulcers large enough to command admission of the patient to hospital oedema must still be eliminated. When the oedema has disappeared grafting is begun. Thiersch's method is useless, very early recurrence being the rule when the patient returns to her usual mode of life. Whole-skin grafting provides a tough covering, which offers a fair resistance to recurrence. As might be expected, however, two or three attempts are sometimes required before the raw surface is successfully covered. That is not surprising in view of the situation and the quality of the tissues.

Carbuncle.

The disease involved the back of the neck in twelve cases and the right shoulder in one. All were treated by excision in the first instance. At the primary operation it is rare that all the diseased tissue can be removed; when the obviously diseased portion is excised there is no means of knowing the extent of the infection which is left behind. Thus it is the rule that acute inflammation continues for some days around the area of excision. Therefore the choice of an antiseptic is of special importance, since the liability to sloughing, which already exists, ought not to be aggravated by the use of any chemical agent which by itself tends to cause necrosis. Under the application of flavine small marginal sloughs continue to appear for several days; these are snipped off. In about eight days there is a clean base. The raw area then begins to contract and healing takes place with that rapidity which observers have frequently noted as characteristic in carbuncular areas. No case has required grafting.

Acute Cellulitis.

In the great majority the disease was in the upper limb, and in many of these the olecranon bursa was involved. Free incisions were made and large packs of flavine dressing were applied. The results were satisfactory and the duration of the disease was certainly not longer than would have been the case had other antiseptics been used. It was distinctly noticeable that the epidermis did not show maceration, and any sloughing that occurred could be accounted for by the virulence of the infective process, since it took place only in those areas in which sloughing was threatening before treatment was begun.

Septic Hands.

This loose term comprises all degrees of pyogenic infection about the hand, from involvement of part of one finger to that of the whole hand with extension to the forearm. The septic hand is a problem by itself, and, probably more than any other condition in the surgery of pyogenic disease, illustrates the need for efficient drainage. Drainage must be followed by antiseptic treatment. When carbolic acid was used there was the constant risk of resulting gangrene of the finger-tips. With flavine there is, of course, no such danger; healing has been invariably good, and although carefully sought for no complications attributable to flavine were discovered.

Acute Bursitis.

In all of these cases the prepatellar bursa was affected. Suppuration had extended considerably beyond the limits of the bursal membrane, as is the rule in the type of case which reaches hospital. Consequently wide incisions were necessary, and gaping wounds remained to be treated. Experience of cases of this kind treated with various antiseptics has indicated that healing is slow. With flavine the purulent discharge disappears in a few days, and in ten or twelve days bars of good granulation tissue are formed. The total duration of treatment is reasonably short if the skin is now undercut and secondary suture performed.

Abscesses.

Only those which required large incisions are noted here. Healing was reasonably rapid.

Fistula in Ano.

After operation the track was dressed with gauze soaked with flavine solution, which was changed frequently. Further trouble from infection of the wounds by faecal matter was not observed.

Osteomyelitis.

The cases were of the acute haematogenous type occurring in childhood or adolescence. They were dealt with on standard lines, which may be described as follows, for instance, where the tibia was affected. The necessary amount of bone was gouged out, and the gutter was sluiced with some bland sterile fluid to wash away pus and fragments of bone and other tissue. The cavity was then packed with gauze soaked in flavine solution, and over the packing a large amount of the same dressing was applied. This was not changed for at least forty-eight hours, lest recurrence of gross haemorrhage should be encouraged by the disturbance. The operation is exhausting, and the loss of blood is sufficiently serious without adding to it by further haemorrhage caused by disturbance of the dressing. It is important to note that in the cases treated with flavine no haemorrhage worthy of mention occurred. The cavity at the time of the first change of dressing appeared practically as at the operation. The dressing was then changed daily. It was found that granulation tissue rapidly covered the walls of the gutter, and occasionally some minute haemorrhages from the tips of granulations appeared at the change of dressing, as has been already noted in the case of burns. The gutter became filled with granulation tissue at a reasonably rapid rate, and if diseased bone had been judiciously removed healing was completed in at least the average time. The effect of the antiseptic on new bone developing from the carefully preserved periosteum was studied attentively. It was soon clear that no harmful effect on the process was attributable to the flavine. The periosteal granulation tissue stiffened in a few days with osseous deposit, and thereafter regeneration of bone advanced steadily.

DURATION OF TREATMENT.

The application of flavine has been continued in the present series of cases until the stage was reached at which it is safe to employ merely an inactive, sterile dressing. Flavine was employed therefore in individual cases for varying periods, frequently up to three months. In no instance was it found

necessary for any reason to substitute any other antiseptic —for instance, because the infection failed to be overcome or because healing was in abeyance.

HISTOLOGICAL OBSERVATIONS.

Tissues were fixed in Zenker's solution usually within a few minutes after excision. Material from twelve cases was examined; these comprised burns of the third degree, carbuncle, cellulitis, osteomyelitis, and recurrence of sepsis in an old healed compound fracture. Inasmuch as the process of formation of granulation tissue and healing of epithelium occurred in uniform fashion throughout the series of over 600 cases, the dozen whose histology was investigated may be taken as fully representative of the behaviour of such wounds under continuous treatment with acriflavine or proflavine.

Granulation Tissue.—This shows the usual constituents, without significant abnormality either of a qualitative or a quantitative character (Figs. 1, 2, and 6). (In the depths conversion into more mature fibrous tissue is observed.) It is noteworthy that the embryonic capillary blood vessels as a rule extend right up to the surface, and there red blood corpuscles may be seen within their lumina (Figs. 2 and 6). This agrees with the clinical observation that in cases treated with flavine when the dressing is removed there is a tendency for minute oozings of blood to occur. Further, mitoses have been found repeatedly in the superficial layers. On the surface of the granulation tissue there is frequently an exudate of polymorphonuclear leucocytes of a few cells in depth (Fig. 4). Organisms, if present in it, are so scanty that they failed to be found on microscopic examination of eleven of the twelve cases in sections stained by Gram's method and by thionin-blue. An interesting observation was made with regard to the staining of this layer of leucocytes; it was found that in sections stained with haemalum and eosin the leucocytes, especially at the free surface, might show poor nuclear staining, and the cells appeared necrotic and disintegrating (Fig. 3). However, in sections of the same tissue which were stained with eosin and methylene-blue, all the leucocytes showed well-stained, clearly defined nuclei (Fig. 4). The significance of this striking difference of behaviour toward the two reagents is not clear, but it indicates that caution must be employed in interpreting appearances of morphological degeneration. Small haemorrhages, when present, could justifiably be attributed to manipulative trauma. In some cases minute isolated deposits of fibrin, intensely eosinophile and retaining the violet stain by Gram's method, are present amid the layer of leucocytes, and sometimes they extend for a short distance into the granulation tissue. This, no doubt, is the microscopic rudiment of the pellicle of certain observers.

Epithelial Regeneration.—In some instances the epithelial margin showed that thinning out which is generally accepted as evidence that the cells are in process of covering the granulation tissue (Fig. 5). Clinical observation has demonstrated that the ingrowth of epithelium proceeded without interruption under the application of flavine; hence other microscopic appearances of the epithelial edge must not be interpreted as evidence of delay or inhibition of its growth. Thus an abrupt, relatively thick edge has been repeatedly seen in cases in which extensive epithelial ingrowth had already taken place and in which this growth continued to progress without interruption subsequently (Fig. 6). The absence of elastic fibres from the subepithelial tissue, as demonstrated by Weigert's method, afforded further confirmation that a region of newly formed tissue was being dealt with.

SUMMARY.

The results are recorded of a series of over 600 severe burns and pyogenic conditions treated in hospital wards continuously with flavine antiseptics (acriflavine or proflavine) by a simple method. The points specially investigated have regard to the rate and progress of formation of granulation tissue, ossification, and healing of skin epithelium. Only those cases are considered in which intimate contact of the tissue with the antiseptic occurred. As compared with other methods of treatment, there was clinically no interference with formation of granulation tissue. There was no evidence of pellicle formation or necrosis. There was no tendency to haemorrhage beyond the slight oozing which occurs from the tips of well-vascularized granulations denuded of their surface in the act of changing dressings and which is to be regarded as evidence of their healthy state. Ossification proceeded actively in periosteal granulation tissue under application of flavine. Epithelial regeneration, both in the form of ingrowth from surrounding skin and from grafts proceeded actively in contact with dressings soaked in flavine solution. Histological examinations in representative, unselected cases have confirmed and supplemented the clinical observations.

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Memoranda:
MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF INTERSTITIAL GESTATION.

THE whole history of the following case—amenorrhœa, passing of blood and decidua, and somewhat sudden onset—pointed even from the first to extrauterine gestation, but it was manifest that nothing short of abdominal exploration could possibly have revealed the exact cause. Interstitial pregnancy is very rare. Personally, I have only seen one other case, so that the unusual features of this one made it appear worthy of record.

On May 31st last I was asked to see Mrs. R., aged 29. She complained of pain in the left iliac fossa, and told me moreover that she was two and a half months pregnant, having had her last period on March 15th. During the night she had passed some blood and membrane per vaginam, the latter having every appearance of decidua. The previous menstrual history was quite normal, and she had had one child. On examination the temperature was 102° F., pulse 120, whilst the abdomen was rather tender over the left iliac fossa. On examination the uterus was found to be enlarged to about the size of an eight to ten weeks' pregnancy. There was nothing to be felt on either side of the womb to suggest ovarian or tubal trouble. I concluded that an abortion was threatening. Twenty-four hours' administration of ergot had no effect, so I admitted her to the Royal Hospital on June 2nd. The next day I examined Mrs. R. under an anaesthetic, dilated the cervix fully so as to admit the index finger, and was rather surprised to find she was not pregnant at all within the uterus. I removed some adenomatous tissue with a blunt curette and again examined the patient, with negative result. My colleague, Mr. R. Massie, who happened to be in the operating theatre at the time, examined her at my request, and agreed with me that beyond the enlargement of the uterus there was no swelling or tumour to be felt. The patient was then put back to bed. On June 4th and 5th her temperature was 99°, and she was fairly comfortable. On the evening of the 6th she began to complain of severe pain on the left side and generally over the pelvic region. The temperature rose to 104° and she had a severe rigor, and again the next morning with the temperature 105°. I saw her at 12.30 p.m. and she appeared very ill. I examined her per vaginam and found that she was extremely tender on the left side, and the left Fallopian tube seemed swollen. It was obvious that the patient was suffering from a very acute pelvic infection affecting the abdominal cavity, so I decided to operate at once.

Operation.—On opening the abdomen in the mid-line, I found the uterus enlarged, and in the left cornu was a cystic swelling, purple in appearance, from which was oozing, through a very small hole, some dark brown fluid. Both ovaries were perfectly healthy, as was also the right Fallopian tube and the distal four-fifths of the left one. On opening up the tumour bleeding was profuse. As the patient's condition was critical and the escaping fluid causing severe toxaemia, I decided to perform a supravaginal hysterectomy. At the close of the operation I inserted a rubber drainage tube at the lower end of the incision down into the pelvic floor. The patient is making an excellent recovery.

On examining the removed uterus, I found the whole organ perfectly normal except for the tumour, which was about 2½ inches in diameter, and situated four-fifths in the left cornu of the uterus itself, the other one-fifth involving the isthmus of the left Fallopian tube. There appeared to be no connexion between the uterine cavity and the tumour, but there was between the Fallopian tube and the sac. The tumour itself contained chorionic villi, but no embryo was visible. It was of the size of a three to four weeks' gestation, which had gone on to molar formation.

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Reviews.

NEUROLOGICAL PROBLEMS OF THE DAY.

A SERIES of lectures printed exactly as they were delivered to the Faculty of Medicine in Paris have been published in a volume with the title, *Questions Neurologiques d'Actualité*,[1] which may be translated, "Neurological problems of the day." They form a volume of the greatest value to the student of neurology. Each of the twenty lectures is from the pen of an acknowledged authority on the subject. Such a collection of monographs provides the reader with the personal views of the writers, as well as with a summary of the recent facts as to many different neurological problems. Within the limits of a review it is impossible to describe in full or to criticize in detail the manifold matters of interest discussed.

A graceful tribute has been paid to the British school of neurology by making the volume open with Dr. Kinnier Wilson's lecture on progressive lenticular degeneration and allied conditions. After reporting, with clinical details, two new cases of the disease which bears his name, the author proceeds to discuss the pathological anatomy and the pathogenesis; it is interesting to note that he is careful to distinguish the disease from pseudo-sclerosis, and to point out the analogies on grounds of morbid anatomy between progressive lenticular degeneration and such conditions as subacute combined degeneration of the cord and pellagra. The physiology of the condition, especially in relation to the involuntary movements, is only briefly discussed.

Dr. Chatelin's lecture on cerebral tumours is a useful general account of the subject. Important and valuable though it be to emphasize the danger to vision involved in delayed surgical interference, we cannot agree with the statement that in a patient who is the subject of a cerebral tumour the visual acuity will remain what it was at the moment of surgical intervention. Localizing signs are described very shortly, too cursorily, in fact, for this section of the lecture to possess any very great value. Though the effect of tumours of the temporal lobes on the optic tracts are mentioned, we find no reference to the important changes in the visual fields which have been found in such cases, and the author seems to us to exaggerate the diagnostic value in cerebral tumour of changes in the cerebro-spinal fluid. The statement that cerebral abscess is rarely accompanied by any intense symptoms of hypertension is rather too sweeping for general acceptance.

In the third lecture Dr. Claude deals with intracranial hypertension and gives in addition a very valuable account of serous meningitis and pseudotumor cerebri. In the etiology of the condition he lays stress on the part played by infections, especially those of the middle ear. His views as to the compression of the hypophysis by serous meningitis can less readily be accepted, and we may be permitted to doubt the frequency of a secondary endocrine defect from this cause. His remarks on treatment are excellent and full of details of practical value.

Dr. Roussy contributes the fourth lecture, on disturbances of sensation from cerebral lesions; here we are pleased to find a full acknowledgement of the valuable work of Head and Holmes. Beginning with an excellent summary of our present knowledge of the thalamic syndrome, Dr. Roussy goes on to give a very interesting account of the disturbances of sensation in lesions of the parietal lobes. In this connexion he lays stress on what he calls the longitudinal or radicular distribution of the sensory loss present in some cases; recent observations on this point would appear to recall the views expressed by Horsley a good many years ago.

A longer chapter on traumatic lesions of the spinal cord by Dr. Guillain follows. In general it may be regarded as an adequate presentation of a subject on which so much has recently been written; our knowledge of it has been much advanced by the lessons of the war. Many points of great practical value to the clinician are fully discussed, especially in regard to diagnosis; theoretical physiological questions are avoided, and we could perhaps have wished for a slightly fuller account of the phenomena of spinal automatism.

In the restricted space at his disposal Dr. Lhermitte gives a good general description of lethargic encephalitis; it is to be regretted that little mention is made of the sequelae, and that the whole domain of the mental symptoms is neglected. Dr. Souques's lecture on the Parkinsonian syndromes is wholly good, the usual chronic variety and that due to the virus of lethargic encephalitis being both fully discussed. A good but brief account of the anatomical connexions of the corpus striatum is a valuable addition.

Dr. Babonneix's description of the infantile encephalopathies is clear and concise, but it would have been well if the author had given some clinical details of the case of mongolian idiocy, a reproduction of whose brain is figured showing a gumma in the cerebral meninges; the reader is left to infer that this lesion was the cause of the mongolism, a view to which few could be found to assent. Dr. Léri's account of the muscular atrophies of syphilitic origin is very valuable and instructive, for the frequency of a syphilitic basis in such conditions as amyotrophic lateral sclerosis, for example, is only now beginning to be generally recognized.

In Dr. Sainton's remarks on exophthalmic goitre the reader will find many opinions expressed which differ from those generally accepted in this country. Thus few here would be inclined to assign so important a place to tubercle and syphilis in the etiology as he appears to do; again, we are surprised to find that in the account of the circulatory symptoms no mention is made of auricular fibrillation—surely an unfortunate omission.

The lecture by Dr. Sicard on the neuralgias and their treatment is a very clear, albeit somewhat dogmatic, account of a difficult subject. His practical lessons in diagnosis and treatment, however, may be heartily praised, although we cannot quite agree with his optimistic views as to the treatment of causalgia by alcoholic injections into the affected nerve trunks.

Of the remaining lectures those of changes in the pupils by Dr. Poulard and on spinal automatism by Dr. Foix are perhaps the most valuable. In the former we note the statement that the author has only met with the Argyll Robertson pupil in cases of syphilis of the central nervous system; there are, however, now on record a considerable number of cases in which this disease was not present and where some other pathological cause was clearly established.

Professor Pierre Marie concludes the volume by a brief but lucid summary of the subject of aphasia, in which he maintains his own now well-recognized views against the older and more classical conceptions.

It is hardly possible within any reasonable limit of space to do full justice, either by way of praise or criticism, to this volume. It can certainly claim to be a most interesting and valuable account of some of the more difficult and absorbing neurological problems of the day.

[1] *Questions Neurologiques d'Actualité.* Twenty lectures given at the Faculty of Medicine in Paris, 1921. With introduction by Professor Pierre Marie. Paris: Masson et Cie. 1922. (Med. 8vo, pp. vi + 551; illustrated. Fr. 28.)

THE SMOKELESS CITY.

THE lay as well as the medical reader cannot but be attracted by a book entitled *The Smokeless City*,[2] written jointly by the Lord Mayor of Manchester and an Associate of the Sanitary Institute, with a preface by the Chairman of the Departmental Committee on Smoke Abatement, and presented in an art wrapper at the moderate price of 1s. 6d. The reader will not be disappointed in its contents; it is a credit to all who have contributed to its production, and is marked throughout as well by intimate scientific and practical knowledge of the subject as by full appreciation of the difficulties of getting the British house-builder and householder to give up even in part his fondness for an open coal fire.

Knowledge and moderation characterize the book from beginning to end. The value of sunlight as a health agency is referred to, and it is pointed out that though factory smoke is largely being brought under control, domestic pollution of the atmosphere is even more important in respect alike of cleanliness and economy. The present methods of obtaining heat in dwelling houses are criticized, and it is noted that this country has lagged far behind all others, partly owing to cheapness of coal—a factor which has for the time departed, probably never to return. Much regret is expressed that the Ministry of Health has not so far taken anything like sufficient advantage of the opportunity afforded by rate- and State-supported housing schemes to require scientific methods of heating, or to give due effect to modern knowledge of the subject, and in concluding his preface Lord Newton asks

[2] *The Smokeless City.* By E. D. Simon, M.I.C.E., M.I.M.E., and Marion Fitzgerald. London: Longmans, Green and Co. 1922. (Demy 8vo, pp. ix + 82. 1s. 6d.)

where is the logic of spending millions of money on so-called social reform "if this particular nuisance, expensive, unnecessary, and offensive, is to be permitted to continue unchecked." He answers his own question by saying that we are only just awakening to the fact that existing conditions are discreditable to a highly civilized community, though Sir Alfred Mond has the honour of being the first Minister to do his obvious duty in the matter.

As regards action which ought to be taken now by owners and occupiers, the authors devote useful and practical chapters to house warming, hot-water supply, cooking, and low temperature fuel. In doing so they discuss, in thoroughly competent fashion, radiation and convection, alleged "drying of the air," ventilation in relation to heating, slow combustion grates, gas fires, electric heating, central heating, and, in fact, every relevant question. They strongly recommend gas fires for most purposes, though not for hot-water supply, and they hold that the popular belief that gas heating is dangerous is "due to a newspaper stunt, and, like many such stunts, is untrue." At the same time they advise that at present one or two coal fires should be made possible in a moderately sized house, so as to avoid failure of reform by insisting on revolution. The importance of the subject for Manchester in particular is illustrated by the story of an M.P. who had an engagement to speak there, and, not feeling well, went to see a doctor as to whether he should risk the visit. The doctor replied: "Manchester? Certainly not. Nobody is well enough to go to Manchester." *The Smokeless City* is an excellent little book, and should be a valuable agent in attaining the object to which it is devoted.

DORLAND'S MEDICAL DICTIONARY.

WE have received the eleventh edition of the *American Illustrated Medical Dictionary*,[3] by W. A. NEWMAN DORLAND. The fact that the first edition saw the light in 1900 and that the editions are now nearly in their teens is sufficient proof that there is a constant demand for this very useful book. We do not envy the compiler of such a dictionary as this his almost Sisyphean task, for he is aware that, while an edition is still in the press, more terms are being coined by the restless workers in medicine and the allied sciences, and that to be of real value his work must be up to date. He therefore cannot rest, but must be for ever collecting and arranging these terms. This edition, we are told in the preface, contains several hundred new definitions, "most of which are not to be found in any other dictionary." The additions have been most numerous in the fields of biological chemistry, endocrinology, immunology, and neurology, though every branch of medical science has received its share of new terms. Among the valuable features of the work are the lists of micro-organisms, diseases, tests, operations, syndromes, etc.; the list of bacilli alone fills more than nine pages, and this in spite of the utmost condensation compatible with clearness. There are also many illustrations and plates, "chosen for their practical value in aiding the text rather than for their pictorial beauty."

In the search for new terms we looked in vain for "*Spironema pallidum*," the designation adopted by the Medical Research Council for the pathogenic organism of syphilis. We did, however, find "vitamin," with the alternative spelling "vitamine." As there appears to be no reason for adding the final *e*, and as the spelling first given is that generally accepted, it would perhaps be well if in future editions no alternative were given. The question of the final *e* in many words—for example, adrenaline, aniline, purine, etc.—is a very vexed one, and those engaged in passing for press collections of papers by various writers, such as those contained in this JOURNAL, are often much put about by the personal idiosyncrasies of the authors. American writers, we believe, as a rule take the short way and leave out the *e* —though we note that Dorland allows "purine" as an alternative spelling. We in England—or at any rate those who go to some pains in this matter—are largely governed by the rules laid down by the Chemical Society, which state that basic substances should invariably be indicated by names ending in *ine*, the termination *in* being restricted to certain neutral compounds.

The book is beautifully printed, on very thin but sufficiently opaque paper (the twelve hundred odd pages with covers form a volume less than two inches in thickness); in its flexible leather cover it is a pleasure to handle, and for its size is wonderfully complete. Dorland has for years been used in this office as a reference book, and it has rarely been consulted in vain. It may confidently be recommended to practitioners and students in need of a dictionary of moderate size.

[3] *The American Illustrated Medical Dictionary*. A Dictionary of Terms used in Medicine, Surgery, Dentistry, Chemistry, Veterinary Science, etc. By W. A. Newman Dorland, A.M., M.D., F.A.C.S., Major, M.C., U.S. Army. Eleventh edition, revised and enlarged. Philadelphia and London: W. B. Saunders Company. 1921. (Med. 8vo, pp. 1229; numerous plates and tables. 35s. net; with thumb index, 37s. 6d.)

ANNALS OF MEDICAL HISTORY.

THE spring number of the fourth volume of the *Annals of Medical History*[4] bears on the cover the portrait of Velpeau, who was an ornament of the French school of surgery during the reign of Louis Philippe when Paris, with its thirty hospitals and five thousand medical students, was the medical Mecca; Dr. J. Chalmers Da Costa gives thumb-nail sketches of the giants of that day, and mentions that Dupuytren, who was a kind of emperor of surgery, annihilated Mellier's contention that inflammation in the right iliac fossa started in the vermiform appendix rather than in the caecum, and thus kept the clock back for fifty years. Most appropriately Dr. J. H. Gibbon of Philadelphia provides a companion account of London surgery in the early part of the nineteenth century, dealing first with the outstanding personality of Sir Astley Cooper who, like Abernethy, was a pupil of Dupuytren, Desault, and Lisfranc in Paris; he is described as the great practical surgeon of his day as contrasted with its great scientific exponent—Abernethy. Professor David Riesman writes on the influence upon American medicine of the Dublin medical school—Graves and Stokes, who are regarded as in large measure responsible for the popularizing of the stethoscope both in Britain and in America. Dr. W. S. Middleton describes the life and works of the great and gentle anatomist, Caspar Wistar, junior, whose memory is kept green by the Wistar Institute in Philadelphia and more familiarly by *Wistaria speciosa*, written Wisteria by the botanist Nuttall, who named it. In an authoritative article extending over sixty-three pages Knud Faber, Professor of Internal Medicine in the University of Copenhagen, traces the progress of nosography, or the systematic description of disease in modern internal medicine, commencing with Sydenham and the nosologists, and then discussing successively the anatomical, physiological, bacteriological, and functional eras. In his final section on constitutional pathology he remarks that the most recent advance in nosography, which is almost entirely a growth of this century, is directly associated with the influence exerted on pathology by modern research on heredity. In a short article Dr. Jacob Rosenbloom deals with the history of pulse timing and refers to Sir John Floyer and his physician's pulse watch. The editor contributes a number of interesting notes, and there are reviews of recent works on medical history.

NOTES ON BOOKS.

THE new number of *Brain*[5] forms the first part of the forty-fifth volume; it bears the name as editor of Dr. GORDON HOLMES, who recently succeeded Dr. Henry Head in that capacity. It contains a paper on Thomsen's disease, by Dr. J. Rosett of Columbia University; a contribution to the anatomy of spina bifida, by Dr. Violet H. Keiller of the University of Texas; observations on cerebellar stimulations, by Drs. F. R. Miller and F. G. Banting, from the Department of Physiology of the Western University Medical School, London, Canada; a report of three cases of supra-pituitary tumour presenting Fröhlich's syndrome, by Dr. Charles N. Armstrong, from the National Hospital, Queen Square; and a paper on the nervous control of the urinary bladder in amphibians, by Mr. F. J. F. Barrington, from the laboratories of the Surgical Unit, University College Hospital Medical School.

We have received for notice the May number of *Surgery, Gynecology, and Obstetrics*,[6] incidentally the official organ of the American College of Surgeons. This journal is probably well known to our readers, for on its first appearance some years ago it achieved instant popularity owing to its excellent format. The fine reproduction of illustrations has always been an especial feature of this periodical, and this, with its thick glossy paper and clear print,

[4] *Annals of Medical History*. Edited by Francis R. Packard, M.D. Spring number, May, 1922. Vol. iv, No. 1. New York: Paul P. Hoeber. (Pp. 1–113; yearly subscription 8 dols., single numbers 2.50 dols.)

[5] Macmillan and Co. Price per part 6s. net. Yearly subscription 24s. net.

[6] *Surgery, Gynecology, and Obstetrics*. Edition for the British Empire. London: Baillière, Tindall, and Cox. Monthly. (Annual subscription, including "International Abstract of Surgery," £3 15s.)

combine to give it a handsome appearance, at that time distinctly in advance of anything that we had in this country. Even to-day its illustrations compare very favourably with our own beautiful *British Journal of Surgery*. The May number contains a study of a case of intracranial cholesteatoma successfully removed by Harvey Cushing. An article by J. O. Polak follows on the abuse of the operation of Caesarean section. A. H. Bizarro reviews a fine series of 123 cases of carpal fractures; whilst amongst several other contributions may be mentioned a paper by Ott on cranial nerve palsies produced by tumours in the region of the jugular foramen, a paper on adult megacolon by Fowler, and a paper by Trout on the subsequent history of the breast remaining after radical amputation of its fellow for carcinoma. An important feature of this journal is its "International Abstract of Surgery," which embodies summaries of the more important articles appearing in the European and American press. These abstracts are very full, and are sometimes illustrated, to the reader's great profit.

"SIXTY-FOUR YEARS A DOCTOR."

Correction.

OUR attention has been called to an error in the review of this book published last week. On page 272, half-way down the first column, we say: "Again, with reference to a case of appendicitis (this in December, 1886)." The date should be December, 1868. As Sir Charles Brown says, there were no operations then for appendicitis, but in 1886 there were, and if the case referred to had happened at the later date the patient would have been operated on, instead of having to use an infusion of common shag tobacco.

The price of Mr. Muirhead Little's *Artificial Limbs and Amputation Stumps*, published by Messrs. H. K. Lewis and Co., Ltd., of London, is 18s., not 18 dollars, as by a clerical error was stated last week.

ANNUAL REPORT OF THE CHIEF INSPECTOR OF FACTORIES AND WORKSHOPS, 1921.

IN the Annual Report of the Chief Inspector of Factories and Workshops for 1921 the method of dealing with the year's work under sectional headings has again been adopted. A marked feature of the publication is the complete absence of superfluity, the impression conveyed being rather that the editor must have been at some considerable trouble to decide what might conveniently be left out. Every item of information given is of value and could not fail to prove useful to any reader, medical or other, who takes an interest in the health, safety, or well-being of those engaged in industrial occupations. As is usual, there is much in the contents of special interest to the medical profession.

The serious depression in trade, as might be expected, materially affected the statistics for the year. The examinations for the certificate of fitness dropped down from 403,660 (1920) to 221,536, medical examinations under special rules and regulations from 225,678 to 175,735, accidents from 138,702 to 92,565, and prosecutions from 1,081 to 573. Food manufacture (particularly sugar confectionery) and the textile machinery branch of engineering are the only trades which were doing any real business. It is curious to note, however, that in spite of these adverse factors the gradual evolution in industrial methods has not stopped; factories increased during the year by 2,685, whilst workshops diminished by 4,944, and there are records of the establishment of greatly improved processes of manufacture, particularly in steel industries. Owing apparently to the institution of a special engineering branch of the inspectorate, it has been found possible to devote a considerable amount of attention to a survey of safety measures and to improving the working of dangerous trades regulations. Combined efforts of this new branch and of the medical branch were directed particularly to the dust problem, and it would appear that some headway was made in devising closed automatic and semi-automatic processes and the improvement of local exhaust ventilation. There seems to be a fairly general opinion that the most frequent and undoubtedly the most annoying stumbling-block to real progress in preventive measures is a combination of the constitutional carelessness of the worker and the undoubted failure of the average employer to realize that the "spirit" equally with the "letter" of a regulation demands a conscientious observance. Some of the details given of what pure want of thought and attention can lead to are really astonishing. Dr. E. L. Middleton examined clinically the lungs and upper air passages of 1,000 workers engaged in metal glazing, grinding, and dressing, and when he has got through another 400 hopes to publish information of value on the medical aspect of the question. The nature and amount of dust given off in these processes is also being closely investigated, and Dr. Middleton made special inquiry into the incidence of silicosis amongst workers in refractory materials in places not coming under the Refractories Industries (Silicosis) Scheme, 1919, and also into the working of the medical arrangements in cases which do come within the scheme. The number of cases of lead poisoning recorded was 230; there were 23 deaths, but the general severity is reported to be below the average. A number of exceptional cases occurred in the cutting of steel plates on old warships by the oxy-acetylene flame owing to the volatilization of lead from the painted surfaces. From the analysis made, Dr. Legge estimates that a cutter doing this work inhales 18 milligrams of lead daily, or 16 milligrams in excess of the amount which can be inhaled without producing poisonous effects. It was also found that some of these cutters suffered from symptoms of "brass-founders' ague" through the lighter plates being galvanized. On the research side investigations have been reopened with a view to find out the exact diagnostic value of basophilia in cases of suspected lead poisoning.

Reference is made to the International Labour Conference in Geneva, which resulted in the adoption of a draft convention prohibiting, except under certain special circumstances, the use of white lead and lead sulphate in paints applied to interiors of buildings and regulating the use of these for other purposes. As regards anthrax, the Conference appointed a committee to study the subject in all its bearings, but particularly with a view to find out some means of eradicating the disease among animals. Reference is made to the successful treatment of East Indian goat hair and Egyptian wool and hair at the Anthrax Disinfecting Station, and also to the possible closing down of the establishment for financial reasons. Attention is drawn to the importance of requiring persons suffering from carbon monoxide poisoning to rest and not to walk about. Particulars are given of a series of investigations made by Dr. Henry on the effects of naphtha fumes and on aniline black dyeing processes. The seriousness of chrome ulceration is demonstrated by particulars collected from twenty-five dyeworks, which show that a total of 130 cases involved 1,144 weeks of lost time.

Dr. Legge devotes a considerable amount of space to certificates of fitness. He specially draws attention to the revision of particulars respecting disease and bodily infirmity supplied by the surgeon in his annual report, and states that the alteration was decided upon as a result of a representation from the Association of Certifying Surgeons pointing out that Section 122 (6) of the Factory and Workshops Act, 1901, asked for a report not on rejections alone but "as to the number of persons inspected during the year and the results of the inspections." As it was late in the year before the certifying surgeons principally concerned could be notified and take the necessary steps to collect the required information, Dr. Legge is of opinion that only about half the particulars respecting disease and defects requiring conditional or advisory certificates have been supplied. He has, however, considered it advisable to publish the table, which now provides a well-thought-out classification of the diseases and bodily defects found, and shows the number under each heading qualifying for rejection and for conditional certificates respectively. In spite of its incompleteness, out of a total of 15,689 requiring rejection or conditional certificates, 10,640 are recorded as having been dealt with on medical grounds, and 1,266 for unsuitable attire (including loose hair). It is noted that, although many occupiers are taking an increased interest in medical supervision, there is unfortunately a tendency to replace payment of the surgeon by contract by payment at piece-work rates. This is apparently regarded as bad policy, for the reason that "a contract enables certifying surgeons to do really good work in periodic examinations apart from that required by the law, to give advice and actually to supervise the work of first aid."

A definite opinion is expressed on the desirability of more co-operation among certifying surgeons and greater uniformity both in examinations and in dealing with defectives, and a strong point is made of the advantages to be derived from co-operation with welfare supervisors and nurses. As regards welfare work it is stated that reports from all over the kingdom show that this movement has held its own in face of the adverse circumstances of the times, and certain new orders have been issued during the year. A separate chapter deals with underground workrooms in London, and an excellent article on health and sanitation shows how much has still to be accomplished.

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THE DISCUSSION ON BACTERIOLYSIS.

THE widespread interest which has been manifested in the subject of the breaking down of bacteria by lytic agents has been largely due to the fact that Dr. d'Herelle, of the Pasteur Institute, Paris, startled the bacteriological world with the hypothesis that this bacteriolysis is due to the agency of a living ultramicroscopic parasite of bacteria. That creatures so lowly as single and apparently undifferentiated bacterial cells should be preyed upon by organisms even lowlier than themselves and become the victims of parasites of inconceivably small dimensions was a conception that at once arrested attention. It was boldly put forward by Dr. d'Herelle in a paper published in September, 1917; in it he affirmed the existence of an invisible microbe which antagonized the dysenteric bacillus. His affirmation has since been the subject of numerous researches and, incidentally, much controversy. Briefly stated, the facts are that it is possible to extract from many forms of organic material an active substance which will pass through the pores of the finest filter, and possesses the property of inducing lysis in a bacterial culture. This active substance, which d'Herelle maintains to be a living organism, can be shown to multiply when in contact with living bacteria, and can be carried over from tube to tube, producing lysis in successive cultures. This is sometimes known as the "phenomenon of d'Herelle," but a similar process of bacteriolysis was described by Twort in 1915, and it was the almost unanimous opinion of those who took part in the discussion in the Section of Microbiology of the annual meeting of the British Medical Association at Glasgow that the Twort and d'Herelle phenomena are identical. Anyone who is at the pains to read the discussion, as reported in this issue (and a very fascinating story it is), will be disposed to accept the statement, and to agree that though d'Herelle cannot be given priority in the discovery of the phenomenon, he undoubtedly deserves credit for having awakened a lively interest in the question raised, and for having stimulated others by his imaginative reasoning to a closer examination of a subject of great scientific interest which may prove to be of great practical importance to medicine.

Concerning the broad facts, all who have worked at the subject are in complete agreement. A broth culture of such an organism as *B. dysenteriae* can undoubtedly be dissolved by the addition of a few drops of a sterile fluid obtained by filtering a faecal suspension through a Berkefeld or Chamberland filter. This is in itself a remarkable fact, but its unexpectedness is entirely eclipsed by the discovery that a drop of the lysed culture can induce exactly the same change in a second culture, and a drop from this in a third, and so on in series. The active substance must certainly have multiplied and regenerated itself at the expense of the bacteria. For d'Herelle the only possible explanation is that there passed through the pores of the filter an ultramicroscopic parasite which, added to a bacterial culture, attacks the organisms, dissolves them by its ferments, and so multiplies and regenerates itself. This organism he has named the "bacteriophage," and he claims that, on the one hand, its virulence can be increased by passage, and, on the other, that the bacteria themselves can be educated to develop protective substances and so defend themselves from the assaults of their enemy.

It must be conceded at once that we have little or no knowledge of forms of life smaller than can be observed with the highest magnifications of the microscope, of microbes more minute, for instance, than the *Micrococcus melitensis*. Yet the imposing list of filter-passing organisms justifies the belief that living things of smaller dimensions exist and may cause most serious disease when they attack man. We must assume that living organisms have been evolved from simpler forms, and no one imagines that this evolution began with a coccus. In the scale of evolution bacteria represent comparatively complicated structures, built up of innumerable living particles; doubtless more primitive forms have existed and probably exist to-day. The theory of d'Herelle cannot be dismissed because it presumes the existence of living agents of inconceivably small dimensions. But we have to ask ourselves if the faculty for regeneration, which is the main foundation on which the bacteriophage theory is based, is an attribute only of living organisms. Dr. André Gratia suggested two analogies for reproduction apart from living beings. "Fire," he said, "is not living, and yet fire is endowed with the power of reproduction. When once lighted, thanks to an initial impulse, such as an electric spark or the mere striking of a match, it can be indefinitely reproduced if fuel is provided." His analogy of the transmissible coagulation of blood in series is also worthy of consideration. The arguments for and against the existence of an ultramicroscopic parasite are set out in the discussion on the papers of d'Herelle and Twort; it is sufficient to remark in passing that the majority of those who have studied the phenomenon are not convinced that d'Herelle's premisses are fully established; they are still looking for a cause "which does not tax too severely one's sense of the naturalness or the likelihood of things."

Dr. Twort, when he first observed the appearance of bacteriolysis in culture, attributed it to an acute infective disease of micrococci, but "though the possibility of its being an ultramicroscopic virus has not been definitely disproved," he now declares that "on the whole it seems probable, but by no means certain, that the active transparent material is produced by the micrococcus." If so, we should expect that the bacteria would benefit by this rapid disintegration of some members of the colony, and Dr. Twort has observed certain long forms of *Bacillus coli* found associated with the lytic agent in the upper part of the intestinal tract which could be cultivated only after the lytic agent had been eliminated. These "special forms" were found to be more numerous in young cultures, and after six to twelve hours were partially dissolved. He suggests that the lytic agent is a normal product of the bacterial cell, formed for the purpose of causing lysis of the "special forms" and so setting free toxins or substances antagonistic to other bacteria. Such a theory presupposes the early differentiation of a bacterial colony into groups with special functions, some destined by a process of sacrificial autolysis to liberate poisonous substances and thus protect their more resistant relatives.

The discussion at Glasgow has undoubtedly done much to clear the air, and this free and open exchange of views of experts will be welcomed by workers at this subject in all parts of the world. Bacteriolysis may well prove to be of great practical importance to medicine, for whatever be the cause of this remarkable phenomenon it is obvious that when the problem is solved it may throw a flood of light on resistance to disease and open up new avenues of treatment. So far, however, the results of using the bacteriophagic element in combating infection have not been very convincing, and it cannot be expected that much practical advantage

will be obtained until we have a more precise knowledge of the factors involved. It is too soon to elaborate any comprehensive theory, for new manifestations of similar phenomena, such as the lysozyme reaction of Fleming, are being reported, and it will be necessary first to study the simplest examples of bacteriolysis by accurate quantitative methods. The problem is not limited to the domains of medical bacteriology, but has awakened the interest of students of all branches of biology, and the results of further researches will be watched with keen interest.

THE VITAMIN CONTENT OF VEGETABLE OILS AND FATS.

VEGETABLE oils and fats are assuming an increasing importance in nutrition, for fats are indispensable in a complete diet and animal fats are dear; hence the world is being ransacked for sources of vegetable fats and oils. Vegetable fats contain, however, very little vitamin A, and hence the replacement of animal fats by vegetable fats in human food raises important questions as to the adequacy of the supply of vitamin A in the diet. In a normal mixed diet vitamin A is contained chiefly in green vegetables and animal fats. Unfortunately the poorer urban populations often do not eat green vegetables with regularity and in sufficient quantity, and there is the tendency among them to substitute cheap vegetable fats for the more expensive animal fats; they tend, therefore, to live on a diet very poor in vitamin A.

Deficiency of this vitamin has not been shown to produce any well-defined disease, in the way that deficiency of vitamins B and C respectively produces beri-beri or scurvy; hence the serious effects due to deficiency of vitamin A are apt not to be fully recognized. It is known, however, that the deficiency produces increased susceptibility to infections, and is also one of the chief causes favouring the appearance of rickets. Partial deficiency of this vitamin may also produce sterility. Animals can store vitamin A in their fat and can draw upon this supply, and hence marked symptoms of vitamin A lack do not readily appear in a healthy adult animal. The animal in order to produce the store of vitamin A must, however, have obtained it at some period or another, and all the evidence available points to the fact that it is impossible to rear successive generations of healthy animals if they are fed on a diet seriously deficient in vitamin A.

These facts suggest that the experiment which is proceeding at present of feeding about half the population of this country on a diet deficient in vitamin A is likely to produce serious consequences. The vitamin content of vegetable fats and oils is on this account a matter of great practical importance, and Drummond and Zilva[1] have recently carried out an interesting research on the subject. They first investigated the vitamin content of the oil-bearing seeds; they found that linseed contained a fair amount of vitamin A, but that in seventeen other varieties of seeds examined there were at most only traces of this vitamin. Though most of the vitamin A present in the seeds passed into the crude oil, the quantity might be less than one-tenth the vitamin A content of butter. The only exception was crude palm oil; highly pigmented specimens of this oil in some cases had a vitamin A content equal to that of butter; unfortunately it was found impossible to render the crude palm oil palatable by any process which did not involve destruction of the vitamin. The result of these researches thus leads to the general conclusion that the amount of vitamin A in vegetable oils is low because there is very little of this vitamin in the seeds from which the oil is produced. No vegetable oil has been found which is at once edible and rich in vitamin, but the high vitamin content of crude palm oil shows that there is a possibility of such an oil existing. An oil of this kind would be of the greatest value, for it would afford a cheap source of supply of vitamin A in the manufacture of margarine.

The results of this research are to a certain extent disappointing, for it had been hoped that the absence of vitamin A from vegetable oils was due to destruction in manufacture; if this had proved to be true it would probably have been fairly easy to remedy the defect. Since the deficiency, however, appears to be due to the fact that the vitamin is absent from the raw material used, or present only in very small quantity, the only hope of achieving the object in view is to find some other oil resembling crude palm oil in its vitamin content but not in its taste.

[1] J. C. Drummond and S. S. Zilva, Studies of the Nutritive Value of the Edible Oils and Fats, *Journ. of the Soc. of Chem. Industry*, xli, 125T, 1922.

THE GROWING ABUSE OF COCAINE.

NOT only do the columns of the daily press provide indubitable evidence of the growing abuse of cocaine, but a communication made last month to the Paris Académie de Médecine by MM. Courtois-Suffit and René Giroux serves to confirm the alarming increase in the illicit traffic of the "*poudre folle*," or "*respirette*," as it is colloquially called. In Paris alone the arrests of those caught pursuing this remunerative and degrading commerce have increased from 42 in 1917 to 212 last year. The bulk of the alkaloid is said to be imported from Germany, and among the troops occupying the Rhineland and employees on the European expresses there are alleged to be those who act as intermediaries. Many and ingenious are the tricks resorted to by cocaine hawkers in the Quartier Latin and the cafés of Montmartre. The trade is also said to flourish in Marseilles and Toulon, in Nice, Monte Carlo, and Biarritz, as well as in Alsace-Lorraine. The wholesale price of cocaine is about 1,300 francs a kilogram, and as it is retailed at 20 to 30 francs a gram it yields a rich profit to the agents in this clandestine business. The authors of the communication cited assert that in America cocaine vendors invade the universities and colleges and insidiously offer the students gratuitous samples of the alkaloid, feeling assured that its victims will resort to them again and again as they become addicted to it, and thus a regular custom is secured. In France, as in this country, severer penalties are called for to check this toxic peril. In a previous communication to the Académie, noticed in our columns on September 10th, 1921 (p. 414), Dr. Courtois-Suffit stated that under the present law in France the highest fine that can be imposed is 10,000 francs. He related an instance in which it had been possible to make 130,000 francs on a single transaction, so that even the maximum fine would have little effect; in practice the fines imposed are very much smaller, and the French courts very seldom exercise the power they have to sentence the offender to a term of imprisonment as well as a fine.

It is clear that, as the authors of the International Opium Convention of 1912 held, the traffic in dangerous drugs of addiction needs international co-operation and control from the source, in order to limit the use of opium, morphine, cocaine, their derivatives and allies, to medical and legitimate purposes only.

The members of the Council of the League of Nations have now before them the second report of their Advisory Commission and the answers to the set of questions they issued; these will also doubtless be considered by the forthcoming meeting of the Assembly. Some fifteen nations among the fifty-one members of the

League have not as yet brought the Convention, even partially, into operation. The amounts of these drugs required for legitimate purposes in each country or in the world at large remain undetermined, and very few statistics have as yet been furnished to the League giving details of the actual manufacture, import, export, and consumption of these drugs even in European countries. It is, however, known that enormous quantities of morphine and cocaine, largely of European and American origin, have been reaching China and Japan during the last few years, and China has again become, like Turkey, Persia, and India, a large producer of opium, despite the benevolent intentions of its feeble central government. Some of the figures vouchsafed in reply to the questions asked by the League of Nations are disquieting, and seem to show that the production of morphine and cocaine is out of all proportion to any probable legitimate requirement. Thus Great Britain manufactured 18,000 kg. of morphine in 1920, half of which was exported. While it is stated on one page that only half a kilogram was exported from Great Britain to Japan in 1920, on another page it appears that in the same year Japan imported 22,000 kg., of which 5,000 came from England and 9,000 from the United States. Again, in 1920 Japan, besides manufacturing 4,100 kg. of cocaine, imported 3,500 kg. of the same drug, about half of which came from the United States. The statistics from the United States had not been received at the time when the Advisory Commission compiled its replies to the questions. Attention is, however, drawn to the "serious discrepancies between the export of drugs from Great Britain to Japan as shown in the British returns, and the imports to Japan from Great Britain as shown in the Japanese returns," and the significant remark is made that "no light has been thrown on the methods by which such large quantities of drugs were apparently exported from Great Britain without the knowledge of the Customs authorities, and the matter calls for further investigation." A new law is said to have been enacted in Japan to take effect on January 1st, 1921, and it is hoped that it "will do away with the abuses indicated." A detailed study of the replies to the questions from which we have culled these extracts would serve to show the extent of the world-wide abuse of drugs of addiction which is going on, as well as the need for impartial international vigilance and effective international co-operation and control.

THE BACTERIOLOGY OF INFLUENZA.

WHEN fifty years hence the progress of bacteriological discovery in the early years of the twentieth century comes to be reviewed the historian will probably call attention to the fact that whilst British investigators made many remarkable discoveries concerning the origin of diseases not met with in this country, they achieved little for the elucidation of the nature of the two commonest scourges of their native land—namely, the common cold and influenza. Such criticism would not be unjustified, for though we speak with confidence to-day of the causal agent of such diseases as malaria, sleeping sickness, and plague, great uncertainty can be detected in our discussions of nasal and bronchial catarrh. The explanation is not to be found in an altruistic commiseration of the sufferings of others accompanied by a neglect of our own. It is due to the fact that we are at present very ill-equipped for the study of those minute forms of life, organisms less than 0.5 micron in diameter, which will pass through the pores of a porcelain filter and yet cannot be satisfactorily stained or cultivated on solid media. An increasing volume of evidence has accumulated indicating that the common cold is caused by one of these ultramicroscopic viruses, and that the bacteria which are found in the secretions of nasal catarrh are no more than secondary invaders. From the paper on influenza with which Dr. Gordon opened the discussion on the bacteriology of influenza in the Section of Bacteriology of the Annual Meeting at Glasgow, reported in this issue, it will be seen that he has isolated a filter-passing organism from an epidemic of the disease, and has thereby confirmed and extended the experimental work of others, notably in America and Japan. Down to the time of the great epidemic which swept over the whole world in 1918 the assertion that Pfeiffer's bacillus was the causal organism had been very generally accepted. The many bacteriologists who turned to the study of influenza in this and subsequent outbreaks began with a bias in favour of Pfeiffer's bacillus, but two difficulties at once arose: one was that the organism was often not found in typical attacks of influenza, and the other that it appeared to be widely distributed, being found in normal throats, and in patients suffering from measles and pneumonia. It must be admitted that as knowledge of the requirements of Pfeiffer's bacillus has increased it has been recovered much more frequently, both from the catarrhal secretions and from *post-mortem* lesions; this is amply proved by Professor McIntosh's work for the Medical Research Council (BRITISH MEDICAL JOURNAL, July 22nd, p. 137), of which he gave a summary to the Section. Experimental inoculation into animals although yielding instructive results has not proved a final court of appeal, because, with the exception of the leucopenic blood response, these animals do not react to influenza quite in the same way as man. It may be said at once that all who have worked at this subject are agreed that influenza-like lesions can be produced in the respiratory tract and lungs by the injection of Pfeiffer's bacillus or even with filtered cultures of it. The point in dispute is, What initiates the attack? Is there not some other factor apart from the influenza bacillus, some agent which prepares the way, leaving damaged epithelium on which the influenza bacillus can act? No organism can continue to exist in the respiratory tract unless living in intimate biological relation with the respiratory mucous membrane and secretion, and it is possible that the influenza bacillus requires the co-operation of some other virus to enable it to act as a parasite to man. In this connexion the work of Dr. Twort is suggestive, for he has shown that Pfeiffer's bacillus will grow readily on media containing no blood when living in symbiosis with a minute filter-passing organism. The difficulties which beset the study of filter-passing micro-organisms are many. These living forms cannot be clearly seen—on culture the only indication of their growth is an appearance of "cloudiness" in a fluid medium; the only definite proof of their existence is that on inoculation they produce a disease which can be transmitted in series. There must be different species of ultra-microscopic viruses, for on inoculation they cause widely different symptoms; the only method of labelling a virus, however, is by the disease it produces. Moreover, as Levaditi has demonstrated, similar ultra-microscopic viruses may be found in normal buccal secretions. The only method of isolating these organisms is by passage through a filter, and filtration is obviously a very crude procedure, for no two filters can be proved to be wholly alike in the size of their pores. Clearly, in the face of so many technical difficulties, all claims made for the discovery of any ultra-microscopic infective agents must be accepted with caution, but the facts Dr. Gordon records are of great importance. He has grown an ultra-microscopic parasite from the filtered secretion of patients suffering from influenza; he has been able to detect these minute particles in fresh influenzal secretion; and he has succeeded in staining the virus recovered in his cultures. Though, as he says, the methods of staining these "parasites" leave much to be desired, yet something has been definitely accomplished along these lines. He does not claim that this ultra-microscopic virus is certainly the cause of influenza, but he has proved that it is present, and that, when once the necessary technical skill has been acquired, it can be recovered constantly from influenza and common colds. The study of these infinitely minute forms of life is still in its infancy, but now that attention has been directed to their importance we may feel confident that the

technical difficulties will be overcome. As for the common cold there will probably be plenty of opportunity for research in the coming winter, and investigators are not likely to be handicapped by an insufficiency of "suitable cases."

PHYSICAL EDUCATION OF GIRLS.

WE publish elsewhere (p. 321) an account of the report on the effects of physical education on girls, prepared by a Joint Committee instituted on the initiative of the College of Preceptors. It is a really valuable contribution to a subject about which a great deal has been written, much of it of little or no value. Of the facts brought out in the evidence given by medical practitioners to the Joint Committee and analysed in the report of the Medical Committee, which is published in full, one of the most important was that, notwithstanding the very large number of girls who have played games and gone in for athletic exercises during the last twenty years, the number of instances in which there was definite evidence of any physical injury was extremely small. Even the number of cases of "accidents of the game," such as a hockey or cricket ball in the wrong place, were practically negligible. We are indebted to Mr. E. B. Turner, one of the Representatives of the British Medical Association on the Joint Committee, for the following observations. "It will be noticed," he writes, "that the committee has expressed no opinion on the advisability of boys and girls over the age of 14 playing together in mixed hockey matches and other competitive games. It seems that such games seriously undertaken will not be good either for the girl or the game, as if the game is slowed down to the capacity of the girl it suffers, and if the girl, with the large amount of pluck so many of them have, attempts to adapt her speed and capacity to that of the stronger boy, it is possible that she may be injured. Of course, this does not apply to country-house friendly games, but to serious matches. In regard to competitive athletic sports, if girls prepare themselves properly and are efficiently taught, no harm is likely to result, provided the distance and other conditions of the contests are properly adapted to them. Tug-of-war, however, is by no means advisable, and should be prohibited. Some of those who answered the questions with regard to rowing drew a distinction between 'rowing' and 'sculling,' considering sculling by far the better of the two. From an intimate personal knowledge of what was probably one of the best double-sculling crews that ever represented a women's college or university, I can say that nothing but good resulted from the racing competitions, but in this instance members of the crew took care to get and keep very fit. It must be understood with regard to the whole of this question that the physical conformation and structure of the young girl will not allow her to 'put up' such good performances as a boy; but there is not the slightest objection to girls taking part in practically all the same games as boys provided they take care to commence gradually and to continue keeping in condition. A man or a boy may do himself irremediable mischief by taking part in a strenuous game or athletic competition when untrained, and the same obtains with regard to the woman or girl; probably the greater number of the cases of injury reported were dependent on this cause. The reference in the report to the necessity of properly fitting a bicycle to the rider is most useful. Many girls for aesthetic reasons ride with the reach two or three inches too long for them, and this may cause mischief as well as interfere with the really effective control of the machine. It appears possible that excessive riding astride on horseback, especially in early youth, may prejudicially affect the muscles and bones of the outlet of the pelvis. The experience of one medical woman, based on her work with over 1,500 girls, was that when about 35 per cent. of the whole number of the girls took part in games, or went in for any hard exercise during the menstrual period, about 67 per cent. of the whole suffered from disturbances, functional and otherwise; but when 97 per cent. played games and took exercise during that time, only about 30 per cent. suffered any disturbance of the function. This is a matter of very great importance, more especially in its bearing on the treatment of dysmenorrhoea by exercise; considerably more investigation is required. The opinion of almost everyone who gave evidence was that 'team games' had a most beneficial effect upon the character and disposition of all the girls who took part in them; the spirit of sportsmanship thus inculcated was of untold worth. There is no doubt that the custom of the universities should be observed and that before commencing an athletic career at school girls should be examined and passed as fit by a medical practitioner who thoroughly understands the subject. My own experience convinces me that one result of the athletic movement among girls during the last thirty years has been a most noticeable increase in height and other physical developments. In many cases, as obtains among boys, girls who have been first-class at their work and taken high honours, have also been very prominent athletes in their schools and colleges."

MILD SMALL-POX.

THE Ministry of Health has issued a useful leaflet on outbreaks of small-pox of mild clinical type. It states that a few such outbreaks have occurred in England during the present year; that there have been no fatal cases; that constitutional symptoms have been slight even when the rash has been abundant; and that the mildness of type is not limited to the vaccinated nor to patients of any particular age, but is related to the character of the small-pox infection itself. Such cases are sometimes being reported as "varioloid" or "alastrim." Investigations have been made by local health officers and hospital physicians, by members of the Ministry's medical staff, and by other experts with special experience of small-pox. It is evident, the leaflet says, from their reports that the disease is really small-pox, and that the outbreaks are to be classed with the epidemics of mild clinical type which have occurred from time to time both at home and abroad. The incubation period has usually been that of variola, whilst the distribution of the rash distinguishes it from varicella. In a few instances there is some evidence that there has been an unusually long interval between the initial symptoms and the appearance of the rash; in some the rash has seemed to come out in successive crops. As regards the action which should be taken when an outbreak occurs it is stated emphatically that none of the customary and necessary preventive proceedings, including vaccination, should be omitted; that close inquiry should be made as to any concurrent prevalence of chicken-pox, so as to secure differentiation, and that to that end chicken-pox should be made temporarily notifiable wherever necessary; for administrative purposes all cases to which the terms "varioloid" or "alastrim" are applied should be looked on as small-pox. Attention is called to the fact that both in the international list of causes of death, and in the *Nomenclature of Diseases* of the Royal College of Physicians, "varioloid" is included under the generic term "small-pox," and so also in the weekly official returns of notified diseases, the two special terms when used being indicated in a footnote. A good deal of correspondence regarding "alastrim" and "amaas" has been published in the JOURNAL. The latter term comes from South Africa, and is equivalent to milk-pox. The derivation of the former is not so clear, but mild small-pox in Brazil was written of as alastrim a number of years ago. The first syllable of the word is perhaps the Arabic definite article, as in alcohol and alchemy. It is confusing to introduce such terms needlessly into the medical vocabulary. Where the disease is recognized in this country, however benignant in strain, the established term should be applied to it, with such words as "mild" or "modified" added in explanation. Last week we published a letter from Dr. R. U. Moffat showing that small-pox came to be called "Kaffir pox" in Kimberley forty years ago, because the place depended for food and fuel on bullock-wagon transport, and was threatened with starvation owing to the alarm of small-pox stopping the traffic. Then the authorities gave currency to the statement that the disease was only Kaffir pox, in order to allay fear. In his Milroy lectures in 1919, Dr. J. C. McVail discussed the

varieties of small-pox, and showed that mild types had existed and bred true in the eighteenth century, and that Jenner, before he introduced cow-pox, had suggested that material from one such outbreak should be used for variolation instead of the much more severe strains normally prevalent. In recent times mild small-pox has prevailed in many parts of the world—South America, the United States, Canada, Australia, and the midlands of England.

MEDICAL RESEARCH AND NATIONAL LIFE.

SIR WALTER FLETCHER'S address at the annual meeting of the Research Defence Society has been published in the July number of the Society's journal, *The Fight against Disease*. He is able, as Secretary of the Medical Research Council, to speak with authority. He did well to praise "the beauty and interest of the work that is being done, the extraordinary skill and patience of the men who are doing it, the enormous services it is rendering to the country, and the great boon it brings us in lightening as it does the burdens of pain and disease." For want of time, he took only two instances—the study of the accessory factors of food, and the study and standardization of pituitary extract—two only, out of the host of instances of research pursued for the good of the country. But the whole address gives us a notable picture of a man who understands and admires and zealously helps the scientific work which is being done, as a State service, for the health and efficiency of the nation. It is strange, for us who know the facts, to think of the opposition and the hatred which have lately been set going against the Medical Research Council. This ill-will is one of the chief products of the antivivisection societies. The work for the health and efficiency of the nation involves experiments on animals. Therefore it is attacked by the usual antivivisection methods. A few weeks ago 102 members of the House of Commons voted for Lieutenant Commander Kenworthy's ridiculous bill "to prevent the application of public money to vivisection experiments." When we reckon how much public money is applied in payment of these 102 members we are the more sorry at the misuse of their votes. Happily, 170 members voted the right way. So the bill, drafted by the leader of one of the antivivisection societies, and sprung on the House, was properly defeated. It will doubtless turn up again. For our masters are in need of more education in these matters. Antivivisection is not content with mere opposition to experiments on animals. It goes on to assert that discoveries thus made are fallacious and valueless. By this impudent assertion it pleases its dupes. As the report of the Research Defence Society says, "The wild campaign, on which one of the antivivisection societies spent £2,000, to hinder the protection of the army against typhoid brought antivivisection into disgrace and contempt, from which it has not yet recovered. But our opponents have plenty of money, and they spend some of it in the propagation of slander and falsehood. Especially, they are trying to follow the advice of one of their leaders, 'Our hope is not in the idle rich; we must touch the heart of the people.' They seem to think that 'the people' will swallow any amount of nonsense, and they seek to persuade ill-educated hearers and readers that diphtheria antitoxin, and antiseptics, and the protective treatment against tetanus are wrong and absurd. Thus, the antivivisectionists are out, not only against experiments on animals, but against methods of practice which are used and approved in every country of the world. Our Society has to reckon with this false propaganda; we have to deal with antivivisection as an enemy of the people." This, indeed, is what antivivisection has become. Bad enough to pour out floods of abuse and slander. Bad enough to try to hinder physiology and pathology. Far worse to put a stack of tracts in the waiting-room of a railway station, advising the public to have nothing to do with diphtheria antitoxin. An immense amount of money is being spent on this evil sort of work. A little handful of experienced perverters of the truth has enlisted many credulous folk who do not realize that they have entered the service of the enemy of the people. It is all very well to call them cranks; but our immediate business is to undo the harm which they are doing.

THE CAUSATION OF SEX.

THOSE interested in the causation of sex will be glad to have their attention drawn to an investigation of the alternation of sex in the oyster which Dr. J. H. Orton is making at the Plymouth Marine Biological Laboratory. He has also made some curious observations on sex change in the American slipper-limpet (*Crepidula fornicata*). That alternation of sex does occur in these creatures seems to be established beyond doubt. The novelty of Dr. Orton's recent contribution to *Nature* (vol. 110, p. 212) lies in the evidence he advances of the rapidity with which the change may occur. He has made a large number of observations, and, though some are still incomplete, he is able to report several suggestive facts. In June, 1921, a sexually mature male oyster, not more than twenty-three weeks old, was collected from the river Blackwater. A number of its fellows of the same age were obtained on specially prepared shells and kept isolated in the sea until July, 1922. A large one among them, about an inch in diameter, was on July 3rd found carrying thousands of young oyster embryos. Dr. Orton assumes that this individual oyster, like its fellows, became sexually mature as a male, and spawned as a male in June, 1921. In July, 1922, as has been said, it had spawned as a female; but a fortnight later (July 18th) it "was again sexually mature and practically ready to spawn as a male. Thus this oyster has already had two and probably three experiences of sex alternating from male (?) to female and from female back to male within about one year." Dr. Orton is not yet in a position to explain why these sex changes occur in the oyster, but is indisposed to attribute them to changes in the environment; he thinks that "the factor for sex causation is within the control of the organism." In this opinion he is confirmed by a study of the slipper-limpet. The young male of this species which has settled on another slipper-limpet has, Dr. Orton says, a "beautifully shaped and well-developed healthy black penis." If the other limpet is a female the limpet settled on it remains male and functions as such for a variable time, which may be as long as five or six years or as short as one. If the male has settled on the left side of the female—the wrong side for copulation—it nevertheless retains its maleness and even develops "an unusually fat and extensible penis capable of stretching probably twice as far as usual." If, on the other hand, the young male falls on some indifferent object the penis is "reduced to a mere discoloured trace," and the individual becomes female. Dr. Orton therefore comes to the conclusion that "the males on the females knew that the latter were there and tried their best to reach them, whilst the totally isolated ones have resigned themselves unreservedly to a complete sex change." It is a far cry from the oyster and the limpet to man, but the failure under these very simple conditions to establish any influence of the environment is certainly significant.

THE COST OF GERMAN PERIODICALS, BOOKS, AND TREATMENT.

THE anomalous condition of the European exchanges, which is threatening to upset some of the time-honoured teachings of political economy, is being exploited with not a little success by German publishers. The *Zeitschrift für Biologie* is a case in point. This useful periodical has approximately as many subscribers outside as inside Germany, and the honour in which it is held in Germany is shown by the fact that its publishers were recently voted a subsidy of 30,000 marks by the scientific committee appointed some time ago to watch over the interests of the most important German scientific publications, the existence of which was threatened by Germany's financial embarrassments. The publisher of this periodical has recently announced that, in spite of its limited circulation and the cost of printing, he is able to dispense with any subsidy and is in the position to double the

payments to contributors. He attributes this to the policy of charging foreign subscribers at the pre-war rate in the currencies of their own countries. Had he not adopted this policy, he would, he says, have been faced with a deficit of about 50,000 marks. His gleeful comments on this transaction should act as a sobering corrective to the slogan of "making Germany pay" dinned into English ears. We take this opportunity to reiterate the statement, made on several previous occasions, to the effect that intending purchasers of German books should not rely upon the price in German marks given by the publishers. Often, if not always, the price charged for volumes exported is much higher; what it is can only be ascertained in any particular case by obtaining information from one of the firms of book importers in this country. Readers who may be purposing to visit Germany will no doubt have noted the statement issued at the end of last week by the Foreign Office explaining the stringent regulations enforced by the German customs officials on travellers leaving Germany. Briefly stated they amount to this, that a traveller leaving Germany is forbidden to take across the frontier goods purchased in Germany of a value exceeding 1,000 marks, nor more than 20,000 marks in German currency, or the equivalent in foreign currency, or cheques, bills, or negotiable instruments, except upon the production of a certificate of importation signed by the German customs authorities at the place of entry not more than one month prior to the date of export. The certificate of importation is good only for the actual currency imported. In Germany the policy of "making the foreigner pay" has indeed got well beyond the stage of the newspaper headline, and in the *Deutsche medizinische Wochenschrift* for July 14th there is a notice about the policy adopted by doctors in Berlin towards visitors from "valuta-rich" countries. With a view to creating a uniform system of fees for foreigners, doctors with a foreign clientèle in Berlin are instructed by their representative committee to exhibit in their waiting-rooms the following notice printed in four languages: "To Our Foreign Patients! The Doctors of Berlin, in Accordance with the Views of Their Foreign Colleagues, expect from Their Foreign Patients Coming from 'Valuta-Rich' Countries the Same Fees for Their Services as Would Be Paid by These Patients in Their Own Countries." To ensure the successful working of this scheme in every detail, the medical profession in Berlin has been supplied with scales of fees stated to be those generally charged in foreign countries, and a sliding scale has been devised so as to differentiate between various classes of patients and various classes of doctors, from the general practitioner to the professorial consultant. This sliding scale also shows the fees appropriate to the treatment of various diseases. The doctors of Berlin are also advised to settle the delicate question of fees before giving their services, and to see that they are paid in German currency. It may possibly be argued in defence of this policy that for a doctor to receive a fee of the dimensions of a tip to a waiter is not to maintain the dignity of the profession. But of the wisdom of this differential policy towards visitors in Germany there must be doubts, even from the point of view of the Germans themselves.

THE FRENCH MINISTER OF HEALTH.

At the luncheon given by the Government to M. Paul Strauss, the French Minister of Health, on August 10th, Sir Alfred Mond, who was in the chair, said that the main object of M. Strauss's visit had been to inspect a number of vacation schools which had received French children from the devastated areas as the guest of various municipalities; but he had taken the opportunity also of studying some aspects of public health administration in this country. French people had every reason to congratulate themselves on having a public man possessed of so large an experience and endowed with so much acuteness of mind to grapple with the difficult health problems left to their country as a legacy of the war. It had been a great pleasure to him to accompany M. Strauss on some of his visits; the Minister would take home with him the assurance that the British people entertained the same feelings of friendship and sympathy with their great ally across the Channel as the people of this country were confident the French people entertained for them. M. Strauss spoke very warmly in reply. He thanked the English people for their hospitality to French children from the devastated areas. The privations suffered by the population of those districts had produced a most serious effect upon their health; he quoted among other evidences of this effect the great increase which had occurred in tuberculosis. It was not, he said, the first occasion on which he had come to this country to study public health administration, but he had found much to interest him on the present occasion; he referred especially to his visits to Bromley, Portsmouth, and Dover, and thanked the municipalities for their readiness to help. Among those present at the luncheon were the French Ambassador, the Earl of Crawford (First Commissioner of the Board of Works), the President of the Royal College of Physicians of London, Sir George Makins, G.C.M.G., Sir George Newman, Sir George Buchanan, Dr. F. E. Fremantle, M.P., and Dr. Nathan Raw, M.P.

HUMANE SLAUGHTERING.

A decision by the High Court, Dodd *v.* Venner, June 14th, 1922, has encouraged societies interested in the humane slaughtering of food animals to stimulate public interest in the subject. The usual method of killing cattle in this country is to knock them down with a poleaxe. In North and South America and in Australia a hammer is commonly used. Stunning by such methods, if done by an expert, must be accepted as humane, but unfortunately not all slaughtermen are experts, at any rate at the commencement of their careers as such. In this country sheep are almost always killed by cutting the throat, after which the spinal cord is dealt with, but consciousness continues for a time during the operation. Calves and pigs may or may not be stunned before slaughter. If not stunned they suffer after their throats have been cut until consciousness is lost as a result of cerebral anaemia. Nowadays the instruments recommended for this purpose are those which discharge a bullet into the brain of the animal to be slaughtered. A few years ago captive bolt pistols were recommended for the smaller animals, the stunning being effected by means of a rod, which was shot into the skull of the animal by discharge of a cartridge and automatically withdrawn therefrom by means of the recoil. The disadvantage of this kind of instrument was that, if not carefully attended to, the bolt was apt to jam, and at the present time the use of bullets is recommended; an instrument which discharges a bullet is, however, potentially dangerous to persons in the slaughterhouse unless properly handled. In 1915 the Local Government Board revised the model By-laws (Private Slaughterhouse Series), offering local authorities the option of adopting alternative clauses known as 9A and 9B. Clause 9A requires that specified kinds of animals must be stunned, effectively before slaughter. This requirement, as adopted by a local authority, nearly always excludes sheep, and quite often pigs also. Clause 9B provides that "a person shall not in the slaughterhouse proceed to slaughter any animal until the same shall have been effectively stunned, and such stunning shall, except as hereinafter provided, be effected with a mechanically operated instrument suitable and sufficient for the purpose." One of the provisos exempted sheep from the requirement for a period of three months from confirmation of the by-law. Animals slaughtered according to the Jewish method are exempted from the provisions of either clause; at the Metropolitan Cattle Market, Islington, some 80 per cent. of the cattle are slaughtered according to the Jewish method. The orthodox Jew, however, only eats the meat of the fore-quarter, so a considerable amount of the flesh of animals slaughtered according to the Jewish method is consumed by Christians. A meat inspector, however, pays attention to many matters not regarded as important from the standpoint of the Jewish ritual. A considerable number of local authorities, including

the County Borough of Reading, have adopted Clause 9B with the sanction of the Minister of Health. Early in 1922 a butcher in Reading, who was a bacon curer, declined to comply with By-law 9B on the ground that it was "unreasonable"—a valid objection in a court of law to a by-law, even though it had been sanctioned by the Minister of Health. The High Court, which is the ultimate court of appeal in this matter, decided that this by-law, if properly made, was "reasonable," and therefore enforceable by penalty; the case accordingly was remitted to the justices with instructions to convict. The societies mentioned are at the present time doing their best to persuade local authorities throughout the country to adopt Clause 9B, and the Minister of Health will no doubt resume his practice of sanctioning a by-law in that form. Efficient kinds of instruments are available for this purpose. For cattle the R.S.P.C.A. killer and the Greener gun are satisfactory; if properly applied there is no risk of accident. For sheep, pigs, and calves the Greener "Safeti" pistol appears to be the best instrument at present available. Medical practitioners whose advice may be sought on this subject will be glad to be reminded that the form of by-law dealing with humane slaughtering allowed by the Minister of Health has been held to be reasonable on appeal to the High Court.

"MASTTUBERKELBAZILLENEINHEITSVAKZINE" AND OTHERS.

FEW physicians have the time, opportunity, or inclination for following in detail the numberless publications dealing with the specific diagnosis and treatment of tuberculosis in the German medical journals. Whatever the quality of these publications, their quantity is imposing, and Dr. Bandelier and Professor Roepke[1] are to be congratulated on the courage and skill they have shown in collecting, summarizing, and reviewing all the recent German work on this subject in one volume. It weighs over 3 lb., but thanks to an orderly system of classification, and an index, it is fairly easy to find one's way and to get a bird's-eye view. Not only the number of specific remedies, but also the multiplicity of the methods of administration, is impressive. The physician has the choice of Koch's old tuberculin, albumose-free tuberculin, new tuberculin (T.R.), new tuberculin (B.E.), sensitized B.E., Selter's vital tuberculin, Landmann's tuberkulol, Klebs's, Rosenbach's, and Béraneck's tuberculins, Carl Spengler's perlsuchttuberkulintherapie, Deycke-Much's partial antigen treatment, Friedmann's turtle vaccine, and Strubell's "masttuberkelbazilleneinheitsvakzine." There is also a liberal choice of serums, including Maragliano's, Marmorek's, Strubell's, Bruschettini's serum-vaccine, and Carl Spengler's "I.K." This list is very incomplete. The methods of administration are almost equally numerous—there are the cutaneous, percutaneous, intracutaneous, and subcutaneous routes, and each of these main routes can be subdivided almost indefinitely. Bandelier and Roepke are remarkably fair in their judgement; the case for and against each remedy is given in abstracts from original papers, and then the evidence is summed up. A favourable verdict is seldom given. This is perhaps inevitable, for the outstanding fact is that, while the specific treatment of tuberculosis in Germany has become more and more complicated and variegated, the morbidity and mortality have gone up by leaps and bounds since the beginning of the war. Overwork and underfeeding are forces against which laboratory ingenuity is practically helpless where tuberculosis is concerned. The impression left by the perusal of this work is that research in the specific treatment of tuberculosis has lately gone competitively mad, and that team work has given place—if it ever existed—to privateering of a sadly unproductive character. Each investigator has his following, and the competitive clamouring of the followers in different camps has done much to obscure the issues. Though the total amount of work done is prodigious, it is only too obvious that an infinite capacity for taking pains does not always yield the fruits of genius.

[1] *Lehrbuch der Spezifischen Diagnostik und Therapie der Tuberkulose.* Leipzig. 1922. Curt Kabitzsch. Pp. 631.

LORD NORTHCLIFFE'S DEATH.

THE death of Lord Northcliffe from a typical attack of infective endocarditis, while in the prime of his life and activity, is all the more deplorable because if he had realized the significance of the early symptoms from which he must have suffered it is practically certain that treatment could have been adopted which might perhaps have prevented the development of the complication from which he died. The acute disease to which he was a victim was due to an infection of the heart by a streptococcus, and was therefore of the severest type of this intractable form of disease of the heart, which on that account is frequently called malignant endocarditis. What seems probable is that he had, in fact, suffered from streptococcal infection for at least a year. The origin of the infection in these cases is often very obscure, but not uncommonly it can be traced to a septic infection around the roots of teeth, and it may be that this is how it began in Lord Northcliffe's case. However this may be, there can be no doubt that he had a general streptococcal infection and that eventually the blood was invaded. Very often the history of this extremely fatal form of endocarditis suggests that the infection, having reached the blood, attacks one of the valves of the heart which may have been damaged, perhaps by rheumatism, many years before. It is known that Lord Northcliffe had a cardiac murmur at least fifteen years ago; how long it had been present before that is not known. It is one of those incidental discoveries which are not of very much significance unless, as in his case, the damaged valve of the heart becomes infected. Although, as has been said, it is possible that he may have had symptoms of septic poisoning which could have been recognized a year or so ago had he then sought medical advice, the fact remains that until the heart was attacked by the infection he was not himself aware that anything was wrong. Remittent fever, with all its well-known accompaniments, exhausting the physical and mental powers of the patient, is one of the usual manifestations of the disease, which, in this instance, followed its almost invariable course, for it is one little amenable to treatment. The symptoms, as already said, were typical, and that sums up the case.

THE EDUCATIONAL NUMBER: NEW FEATURES.

THE Educational Number of the BRITISH MEDICAL JOURNAL for 1922 will be published on September 2nd; it will contain certain new features. We shall have the privilege of publishing an introductory article, contributed at our request by Sir Clifford Allbutt, on the training of the medical student, and another, by Professor W. E. Dixon, on the place of pharmacology in the medical curriculum. In view of impending changes several sections have been rewritten and much enlarged. A special article on the new era in medical education foreshadowed by the resolutions and recommendations of the General Medical Council, which will apply as from the beginning of 1923, will be published, together with details of these resolutions and recommendations. The concise information annually provided for intending students of medicine and newly qualified practitioners has been revised throughout, with the co-operation of the deans and secretaries of the various medical schools and kindred institutions in Great Britain and Ireland. Any members of the Association who may have got into the habit of looking upon the Educational Number as an annual guidebook to the profession which appears in the holiday season would do well to revise their ideas this year. The names of the authors of the two opening articles in our forthcoming issue of September 2nd are a sufficient indication that their words will appeal to a wider audience than the prospective student and his guardians. We mention this matter a fortnight ahead in order that no reader may overlook through inadvertence the important new features which will be found in the Educational Number of the BRITISH MEDICAL JOURNAL for 1922.

Nova et Vetera.

SYDENHAM.

THE classics of medicine are more talked about and less read than those of other ancient sciences, and there are good reasons for the neglect. The mathematician who is curious to know how theorems which he learned at school first saw the light has not to read Latin or even to wade through the collected works of defunct masters. Ostwald's *Klassiker der Exakten Wissenschaften* are available. At the cost of a few pence and a moderate knowledge of German he may read many of the best works of the best writers. The English medical practitioner in search of specimens of old and good professional works of pocket size has had Harvey on the Circulation available for some years, one work of Galen (in the Loeb series) since 1916, and now has Dr. Comrie's selections from Sydenham.[1] Dr. Comrie has done his work admirably. His volume is attractively produced; the illustrations are pleasing and the explanatory notes neither too concise nor overloaded with tedious erudition. No two students would be likely to agree as to what should be contained in an anthology—very likely some learned man will complain that Dr. Comrie has left out the best things; but the practitioner who puts Dr. Comrie's book into his pocket and uses the opportunities which this summer's weather is sure to supply will no longer have to take Sydenham's reputation on trust.

Nominally, Sydenham is one of the most accessible of classics. The old Sydenham Society's editions, Greenhill's text, and Latham's translation are in every library and not scarce in the second-hand book market. But Latham's translation is, as the author of *Rab* more than hinted, very dull, while the text is Latin—and, we think, remarkably unattractive Latin.

Why has Sydenham become immortal? Until now we should not have ventured to give reasons because the means of judging whether our reasons were right or wrong have not been in everyone's hands. Now, thanks to Dr. Comrie, anyone can tell whether we have hit the mark, so it may amuse Dr. Comrie's readers if we attempt to justify the title of "English Hippocrates" given to Sydenham.

We hope it is not irreverent to think that Sydenham is immortal because he applied to the art of medicine the spirit of Pauline Christianity as set out in four verses of Corinthians (i, 22–25); he separated himself both from the Jews who require a sign and from the Greeks who seek after wisdom; he believed that "the foolishness of God is wiser than men, and the weakness of God is stronger than men."

The part of the Jew seeking a sign was taken by the physician who wearied his brains "with curious and irrelevant speculations, which to fulfil the promise of medicine, to save men's lives, are not worth anything," and the seekers of wisdom were "the slaves and followers who like the first inventors of speculations do deadly battle over these whimsies, while not a man of them reaches the truth, because however hard we try, we mortals cannot learn, and I think never will learn, how Nature acts, but only what she does and where she does it" (*Epistolary Dissertation*, 56). Sydenham believed that there was no vicarious salvation to be found by the physician; very little was to be learned from books—hence his advice to read *Don Quixote*—nothing to the purpose from what we now call the institutes of medicine, from anatomy and physiology. There is much in his attitude which recalls an earlier revulsion from the wisdom of this world; his "Nature" is the "God" of the Christian fathers, a wisdom not to be comprehended by mortals. At this time of day we are in small danger of being misled by the exaggerations into which his philosophy of medicine beguiled him. But there is some risk of our forgetting that his doctrine is fundamentally true, that a physician becomes really wise by the study of individual patients, that the reading of many books and the performance of many experiments in laboratories can never be substitutes for the "practice and that alone" which "elicits the indications of cure out of the phenomena of the diseases themselves" (*Epist. Resp.*, 1, 51).

We can all remember the sort of thing we did when we were clinical clerks. The medical registrar or the house-physician had entered on the bed sheet of the patient "pleurisy with effusion," and we went home and looked up "Osler" and thereafter found in the patient the physical signs which he *ought* to show, but very often did not. This must be the way of beginners, but we need to guard ourselves from the habit of looking upon patients as the living "movies" of textbook descriptions, from the danger of being misled by the analogy of diseases with plants which may be "spotted" by aid of a textbook. Although Sydenham himself used that very parallel it never misled him in practice. "I confidently hold that the aforesaid species of disease, in particular the continued fevers, may vary so enormously that you may kill your patient at the end of the year by the method which cured sufferers at the beginning of it" (*Obs. Med.*, i, 2, 37). So it is not enough to identify your particular case of measles with the measles of "Osler" or "Taylor"; you must study your patients individually.

Some men of our time have dreamed that, whether by bacteriological, chemical, or perhaps physiological research, a great intellectual synthesis may be achieved, a new universal *organon* discovered, which will enable us to give an account of the changes of general and individual type of diseases, to foretell them, and so act appropriately. In the dialect of our theological comparison, such persons are like those who look for the immediate coming of the Kingdom of Christ. To Sydenham anything of the sort was an idle dream; whether what has been learned since his time is enough to warrant a change of attitude is a point which might be debated. But the discussion is idle, since, here and now, the method of Sydenham, the natural historical method of study, can be followed without hindering the work of those forging the *organon*. Were it permitted to Sydenham again to take coach exercise in Pall Mall and to visit the new home of his old college, he would surely recognize that the "philosophers" had produced something better than "curious and irrelevant speculations," that Lister and Pasteur owed more to them than to him. But we think he would again enforce upon general practitioners the lessons of which the college physicians of his time stood in need, and perhaps think better of Sir James Mackenzie and his school than of the apostles of "Epidemic Constitutions."

> "I am fully convinced," he would say again, "that, for the formation of right judgement in these matters, there is nothing so beneficial as the exact observation of the natural phenomena of the diseases themselves, likewise of whatsoever helps or hurts, and lastly of the remedies themselves and of the method we adopt to try to drive away the disease. By diligently examining and weighing all these I learn the nature of the ill and from whence I am to take indications of treatment. I learn it much better and much more surely than if I took some speculation concerning the nature of this or that principle as my pole-star. The choicest dissertations of this kind are no more than pretty tricked out metaphors which will go the way of all figments of the fancy, not grounded in the nature of things; time will utterly destroy them. The decisions of Nature, grounded in the truth of things, these shall not perish save with Nature herself." (*Tract. de Hydrope*, 23.)

Hippocrates said that philosophy must be wedded to medicine and medicine to philosophy, that the physician who is also a philosopher is evened with the gods (*De habitu decenti*, cap. 5). The puritan Englishman was humbler minded, but his gospel is one of encouragement, and its message is this: That way of "research" which is open to every doctor, which needs neither ultra-microscopes, nor knowledge of Greek, nor familiarity with differential equations, is the best way of all. Perhaps the greatest of all discoveries will not be made by the "consultant" whom we recently found so difficult to define, but by a general practitioner who brings to the research neither the contents of the *Index Medicus* nor the arithmetical wisdom of the Registrar-General and his assistants, but the brains with which Opie mixed his colours and the courage of Sydenham, together with his humility. This courage and humility, we think, justify Sydenham's reputation; whether we are in the right, Dr. Comrie's readers can judge for themselves.

[1] *Selected Works of Thomas Sydenham, M.D.* With a short biography and explanatory notes by John D. Comrie, M.A., B.Sc., M.D., F.R.C.P.Edin. 1922. London: Bale, Sons, and Danielsson. (Pp. 153. 8s. 6d. net.)

PROFESSOR SCHAUMAN, of Helsingfors, who was well known for his studies on bothriocephalus anaemia, pernicious anaemia, chlorosis, inequality of the pupils, and the etiology of appendicitis, has bequeathed a large sum for the foundation of a scientific institute for the study of heredity.

THE French Minister of Health has organized a special commission to co-ordinate investigations as to the etiology, clinical study, treatment, and prophylaxis of cancer. The honorary president of the commission is Dr. E. Roux, of the Pasteur Institute, and Professor Quénu is the acting president.

THE PHYSICAL EDUCATION OF GIRLS.

AT the instance of the College of Preceptors a Joint Committee was formed in October, 1921, to consider the effects of physical education on girls. Representatives were appointed by the Royal College of Physicians of London, the Royal College of Surgeons of England, the British Medical Association (Mr. E. B. Turner and Mr. R. C. Elmslie), the Medical Women's Federation, the British Association for Physical Training, the Ling Association, the National Union of Women Teachers, the Association of Assistant Mistresses in Secondary Schools, the Private Schools Association, and the College of Preceptors. The Association of Head Mistresses did not accept the invitation to send representatives.

The Committee issued a paper of questions to persons who might be expected to have special knowledge of the subject. Altogether 629 replies were received, and of these 233 were from medical practitioners and 158 from women medical students; 185 replies came from headmistresses, 96 from State-aided schools, and the others from independent schools. A report of an investigation by the Ling Association was also considered. A special set of questions were sent to medical practitioners and their replies submitted to a committee consisting of the medical members.

Amongst the schoolmistresses there was a general consensus of opinion that the effects of games and physical exercise on the disposition and character of girls were beneficial; but a small number thought there was a tendency to magnify the relative importance of games, to the detriment of character.

The question whether gymnastics with apparatus is suitable for girls was specially inquired into; about 66 per cent. of the schoolmistresses were in favour of such gymnastics, but about half of those who approved were of opinion that there was special need for careful supervision if apparatus was used. Amongst women students, medical or otherwise, 80 per cent. were in favour of the use of apparatus. Very few harmful results were attributed to it, though some, especially among the women students, thought that such gymnastics conduced to muscular strength and development without gracefulness. Gymnastics without apparatus was approved alike by mistresses and by students, medical or otherwise, though a few considered such training as less valuable than gymnastics with apparatus. The need for fully qualified gymnastic teachers was emphasized.

Of games, lawn tennis and netball received very general approval; hockey, though approved by the majority of mistresses and students, was regarded by some as suitable only for the older and stronger girls and by some as too rough or strenuous a game for girls. Several objected to it as inducing faulty positions.

Very little serious objection was raised to cricket; some of the disapproval expressed was based on the ground that it entailed too much standing and might thus induce faulty carriage. Lacrosse was approved by almost all who offered any information about it. Football met with less approval than any other game; of fifty-two schoolmistresses who expressed their views on this game, only two were in favour of it, and among women students, though a few approved, many more objected to it on physical or other grounds; in general it was regarded as entailing too much strain.

Swimming was generally approved, but many schoolmistresses and students recognized that harm might be done by remaining too long in the water and that swimming was an exercise entailing some strain on the heart, so that it is not suitable for all girls. The danger of heart strain was emphasized even more in regard to rowing, which, though approved by the majority of those who gave information on the subject, was thought by some to be too strenuous an exercise for girls in general. Racing in rowing was condemned by twenty-seven out of thirty-four women medical students, and ill effects were recorded. Cycling in moderation, the cycle being properly adjusted to the individual, met with a large measure of approval; some schoolmistresses pointed out that when girls have to cycle too long a distance to school, the strain makes them unfit for mental work. The value of dancing was generally emphasized, eurhythmics were approved by some, whilst others were in favour of horse-riding, fencing, golf, badminton, or fives.

Contests in games and sports were thought by many to require careful limitation and grading with a view of preventing overstrain.

There was very general agreement that ill effects would be less likely to occur from the more strenuous forms of physical education if previous medical examination were more general, and that the risk of such effects could be reduced if a short time was devoted to games or sports daily rather than a longer time once or twice weekly. Girls should not be subjected to strenuous physical exercises after hours of mental strain, and ample time should be allowed for rest after games and sports before beginning mental work again; facilities should be given for changing underwear after strenuous games. A wise and sympathetic tact is an essential factor in adequate supervision by the games mistress.

It was found difficult to summarize the opinions held as to the general, physical, and mental effects of games and sports upon girls. By many it was thought that apart from physical fitness they conduce to alertness, resourcefulness, and judgement, and encourage a public-spirited and healthy outlook. On the other hand, a minority thought that games and sports tended to foster a love of pleasure, detrimental to home and other interests and to lessen womanly qualities.

Medical Report.

The opinion of the medical members of the Committee, after consideration of the information before them, was as follows: Suitable physical education, including games and sports, is as generally beneficial to girls as to boys. There is, however, need for discrimination; individual girls may be unfit for particular forms of exercise, and on this account medical examination as to fitness is generally desirable.

Amongst the games the committee had under consideration, tennis, netball, lacrosse, golf, hockey, cricket, and football, only the last is considered unsuitable for girls. Of sports, swimming, rowing, cycling, horse-riding, are all good for girls, provided that they are carried out under suitable conditions and excess is avoided. Competitive games and sports are equally permissible, provided they are undertaken with due regard to the fitness of the individual.

Any game or sport may become unsuitable if practised in such a way or to such degree as to cause undue strain or fatigue. There is a balance between mental exertion and physical fatigue which cannot be altogether ignored. A girl who is working at high pressure for examinations may have to play games less strenuously, and fatigue by physical exercise is a bad preparation for mental work.

With regard to gymnastics, whether with or without apparatus, there is no doubt of the value of disciplined exercises under expert direction for promoting the harmonious development of the muscles and preventing faulty position and carriage. The use of apparatus entails special care, as injurious effects may come from injudicious exercise of this sort.

An important question in connexion with the physical education of girls is whether and to what degree there should be restriction of physical exercise during the menstrual period. Abstention from games and sports has been very generally recommended hitherto, but in recent years evidence has been brought forward to show that these restrictions are harmful rather than beneficial. The medical members of the Committee are not prepared at the present time to state any final judgement on the question, but consider that the evidence they have justifies more extensive trial of the voluntary continuance of games, sports, and gymnastics (swimming excepted) during the menstrual period.

The disturbance of functions so often observed during school life occur also in girls who do not take part in athletic pursuits, and the influence of physical exercises on these disturbances is quite open to doubt. The production of any internal displacement is probably very rare.

Perhaps the most important point which arises in connexion with the physical education of girls is its influence in after-life, if any, upon motherhood.

It is difficult to obtain conclusive evidence on this point. It might be thought that the increased muscular and bone development consequent on much physical exercise might increase the difficulties of parturition, and, whether for this reason or not, labour has been thought by some to be lengthened in such cases. On the other hand, the increased muscular power might serve to facilitate parturition, and some observers have attributed a good result in this way to strenuous physical education.

On the whole, it would seem that there is no clear proof that strenuous physical education has any special influence either upon the prospect of motherhood or upon the difficulty of labour.

The conclusions reached by the Joint Committee may seem less precise and positive than might be expected, but the Committee felt that the evidence available was not such as to justify dogmatic statement on many of the points under consideration. Nevertheless, they hope the investigation may not have been without value if it draws attention to the important problems of the physical education of girls, and particularly if it serves to stimulate further research, and to encourage the collection of what is much needed—namely, well attested facts and observations.

Signed on behalf of the members of the Joint Committee,
G. F. STILL, *Chairman.*

SHELL SHOCK.

THE report of the War Office Committee of Inquiry into Shell Shock[1] issued last week is a document which may well interest the general reader as well as those members of the military and medical professions to whom it makes a more direct appeal. It may be said at once that the Committee has been successful in producing a report of which it can be asserted that it deals with every aspect of a very important problem. Throughout the report the use of the term "shell shock" is deprecated as conducive to much misapprehension, and the Committee decided to divide the cases into three categories: (1) true commotional disturbances; (2) emotional disturbances; and (3) mental disorders. Owing to the prohibitive amount of labour and expense involved in their preparation statistical details are not included, and we agree with the Committee that this omission is not a serious fault.

After an interesting preliminary in the shape of an historical memorandum from the pen of the Hon. John Fortescue, we are introduced to a summary of the evidence of some of the many witnesses examined; these included combatant officers, both staff and regimental, medical officers of regiments as well as neurologists attached to special shell-shock treatment centres, several of the consulting physicians lately attached to the armies in the various war areas, and finally a large number of distinguished medical men who were responsible for the treatment in this country of cases of shell shock and other nervous disorders. The evidence also of certain patients suffering from the condition was included.

Etiology.

Sir John Goodwin was emphatic on the value of good discipline and training in the prevention of shell shock, while General Lord Horne agreed with the usual regimental opinion that a large number of shell-shock cases in a battalion was a sign of poor moral.

Professor Roussy laid stress on the hereditary or constitutional factor in many cases exhibiting psycho-neuropathic affections, and considers that mental defectives were very often to be found among the hysterical cases. Dr. Burton Fanning's evidence on the frequent occurrence of the neuroses in the Home Forces had the effect of emphasizing the emotional factor in the etiology. Dr. Hurst's experience of neurasthenia in the Eastern theatres of war exemplified the important part played by infections and exhaustion; he agreed also as to the great difficulty of distinguishing clearly in some cases between neurosis and simulation. It is quite impossible to review in detail all the evidence brought forward; many facts of great practical value emerge from its study, especially that of the combatant officers and of those medical officers whose duties lay in or near the front line. Here we find a consensus of opinion that a poor moral and defective training are one of the most important, if not the most important, etiological factors; also that shell shock was a "catching" complaint—so much so, indeed, that in the Ypres salient the Guards refused to go into the line with a certain battalion next them.

The influence of fear, again, is a cause upon which all witnesses were agreed, especially in regard to the mental conflict engendered between the natural fear on the one hand and the duties of discipline and patriotism on the other. The fact that the neurosis serves a purpose—that is, removal from the danger zone—is brought out clearly in the evidence.

All the witnesses were agreed that the cases belonging to the class of true shell concussion were few; emotional shock was the commonest cause, to which was to be added a general nervous and mental exhaustion as the result of the prolonged strain and hardships. Thus Dr. Gordon Holmes found that between 4 and 10 per cent. of the cases were commotional; Dr. Johnson found 5 per cent. of commotional cases, 1½ per cent. only of cases showing lesions of the central nervous system, and 1 per cent. of cases with rupture of the drum of the ear.

There was a general consensus of opinion, again, that neuroses were common as the result of the action of poison gases, especially by the production of conversion hysteria.

Shell Shock as Battle Casualty.

Regarding the important practical question as to whether shell shock should rank as a battle casualty or not the Committee makes the following recommendations:

1. That concussion or commotion attended by loss of consciousness and evidence of organic lesions of the central nervous system or its adjacent organs (such as rupture of the membrana tympani) should be classified as a battle casualty.
2. That no case of psychoneurosis or mental breakdown, even when attributable to a shell explosion or the effects thereof, should be classified as a battle casualty any more than sickness or disease is so regarded.
3. That in all doubtful cases it is desirable to have the classification determined by a board of expert medical officers after observation of the patient in a neurological hospital.

Treatment.

Questions as to the best treatment elicited a majority of opinion to the effect that cases should be kept as far as possible in the divisional areas and not invalided home; experience of cases treated for long in home hospitals showed that seldom were such men able to return to the line.

The value of the regimental medical officer is insisted upon, and it is further stated that he needs no special neurological knowledge; one witness insisted that "an intimate knowledge of human nature" was the most important requisite, a fact which few could be found to dispute.

As far as the actual methods of treatment are concerned we find that the majority of witnesses were not in favour of the Freudian method of analysis, but rather of the more simple methods of persuasion and explanation. The value of occupation and re-educative exercises was insisted upon. Indiscriminate sympathy from the general public is deprecated. Another important point in treatment is the harm done by the frequent transfer of a patient from one hospital to another, with the result that no consistent line of treatment can be adopted.

The Committee lays down recommendations under which a soldier should be returned to the line, and perhaps this may form a guide for future use.

It is pleasant to read the conclusion that true malingering was probably of rare occurrence, but the Committee goes on to say that exaggeration of symptoms or the prolongation of a condition that no longer really existed was far from uncommon, and that such a form of partial malingering was very difficult to deal with.

Shell Shock and Insanity.

Much has been written in the general press of the cases of insanity supposed to be due to shell shock. This supposition receives no support from the witnesses who were examined on this point. Dr. Stanford Reade adds the significant statement that of the service patients now in asylums the majority in his opinion are suffering from dementia praecox. Professor Roussy says in the same connexion that the war created nothing in the way of the psychoses.

Prevention of Shell Shock.

The prevention of or the lessening of the incidence of shell shock is a subject which receives much attention, and it is highly significant that the first factor regarded as tending to increase the incidence and severity of mental and nervous disorders in time of war is the perpetuation of the term "shell shock."

Important conclusions are detailed in regard to the great importance of good discipline and moral, in fact of a thorough and careful training, as prophylactic measures in the prevention of the condition. The value of adequate rest away from the line is another point upon which much stress is laid. Methods of recruiting, both in time of peace and war, are dealt with at some length, and the difficulties and deficiencies discovered by the war are fully described.

One conclusion reached in this connexion is that not enough attention has been paid to the mental and psychological aspects of military service.

There are three appendices, giving the questions issued for the guidance of witnesses, tables of statistics of cases of neurasthenia treated in the Neurological Department of the

[1] The Report of the War Office Committee of Inquiry on Shell Shock. 215 pp. (London: H.M. Stationery Office. Cmd. 1734.) Post free 6s. 3d.

British Salonica Force, and outlines of the principles of training considered desirable in the prevention of shell shock.

The report is one which in all its parts will amply repay careful study.

THE HEALTH AND HEALTH ADMINISTRATION OF ENGLAND.

A PRELIMINARY notice of Sir George Newman's report for 1921[1] on the State of the Public Health appeared in our issue of August 5th. The report is exceptionally short, but it takes note of all parts of the field of public health work in England and Wales. Its brevity makes possible, by further condensation, the presentation to our readers of an epitome of the health administration of England sufficiently short for convenient perusal and yet inclusive enough to avoid omission of anything of primary importance. It is very desirable that every practitioner of medicine should realize the scope and the variety of detail in modern work as carried on in this country for the maintenance of health and the prevention of disease.

The order in which the essentials of preventive medicine are stated in this report is unusual. To develop and fortify the physique and powers of the individual comes first; next we must seek to discover and then to prevent or remove the causes and conditions of disease, whether concerned with domestic or industrial environment or personal habits. As urbanization advances the fundamental necessities of a healthy community can only be provided by itself.

A Ministry of Health as a central co-ordinating department was proposed by Sir John Simon in 1854, but was established only in 1919. In addition, the country requires local authorities, voluntary agencies, the medical profession as instrument and interpreter of hygiene, and an educated people willing and able to practise the way of health. The voluntary element is invaluable, and not the medical profession but the local authorities, representing the people, must control expenditure. Wise expenditure is like a lifeboat or a fire engine, and is besides a long-term investment, yielding a thousandfold, but only in course of years or generations. Millions of persons in Russia and elsewhere died in 1921 because there was no sanitary service to save them. Wise expenditure is true economy. Here the author changes the order already noticed. "A sanitary environment and education in hygiene which affect the entire population obviously stand first." Next are maternity and child welfare, the health of the school child, industrial hygiene, the prevention and treatment of disease, both infectious and non-infectious, and research.

THE STATE OF PUBLIC HEALTH.

The birth rate in England and Wales in 1921 was 22.4, a decline of 3.1 from the previous year, but the 1920 rate was exceptionally high as a reaction from the war years. The death rate fell from 12.4 to 12.1, the lowest on record. The following table gives the figures for the principal causes of death:

England and Wales: Deaths from Principal Causes, 1921.

Disease.	Number of Deaths.	Proportion per 1,000 Deaths from all Causes.
Measles	2,241	5
Whooping-cough	4,576	10
Diphtheria	4,772	10
Influenza	8,995	20
Tuberculosis of respiratory system	33,505	73
Other forms of tuberculosis	9,173	20
Cancer	46,022	100
Diseases of nervous system and sense organs	48,217	105
Disease of the heart	53,707	117
Other diseases of circulatory system	14,571	32
Bronchitis	33,684	73
Pneumonia	34,703	76
Other diseases of respiratory system	5,707	12
Diarrhoea and enteritis	17,035	37
Other diseases of digestive system	18,329	40
Diseases of genito-urinary system	17,852	39
Premature birth and diseases of early infancy	26,442	58
Old age	27,406	60
Violence (all forms)	16,501	36
Other causes	35,115	77
Total	458,629	1,000

[1] On the State of the Public Health. Annual Report of the Chief Medical Officer of the Ministry of Health for 1921. H.M. Stationery Office; to be obtained through any bookseller. (Pp. 115. 1s. 6d. net.)

Infant Mortality.

Infant mortality was 83 per 1,000 births. This is higher than in the previous year, when it was 80; yet is even more satisfactory, looking to the hot and dry summer of 1921. The diarrhoea and enteritis rate under two years rose from 8.3 to 15.5, yet the total rate, including these figures, rose only by 3, so that in deaths from other causes there was a decided fall. A table given later in the Report shows the great progress made since the beginning of the century in diminution of deaths of infants. In the first four weeks of life, however, there has been little improvement. That age period has not yet come under effective control, no doubt owing to constitutional defect, part of which is due to insufficient antenatal attention; among illegitimate infants the rate was as high as 158 against 83, and the reasons are unfortunately easy to find.

Adult Mortality.

The lessons of the English life tables for the two periods 1838–54 and 1910–12 (unfortunately the latest available) are that the average lifetime of males has increased from 40 to 51 years, and of females from 42 to 55 years. But this is made up of a higher rate of improvement in the early years, and a lower in the later, so that at the age of 45 the extension of male expectation had only been from 22.76 to 23.92 years, and at 55 the condition was stationary. Sweden is much better off; at 45 a man there has three more years to look forward to than in this country, and at 55 the same difference exists. It was not always so. The Swedish expectation used to be lower than the English. Our largest single cause of death at these ages is pulmonary tuberculosis, and its decline has been much slower than in the earlier age groups. Respiratory diseases, including pneumonia, come next, and here manufacturing Lancashire has a bad pre-eminence not to be explained wholly by climate, as Cumberland is much lower. Neither is poverty the reason. Incomes in Bolton and Warrington, as shown by Professors Bowlby and Burnett Hurst for 1911–13, were a good deal higher than in the industrial town of Reading, yet the Reading death rates were much lower. Though there is more overcrowding in the two Lancashire towns, that can hardly account for Reading's more favourable health position; it has more overcrowding than Northampton, and yet has a lower death rate.

In summing up Sir George Newman does not profess to put his finger on the exact causes of the statistical facts. After discussing various relevant considerations he says:

> "Yet neither by physique alone nor by ventilation of workp'aces alone will a security against disease be afforded. Temperance in food and drink is not alone a perfect defence. It is by the accumulation of all these safeguards, by temperance in food and drink, by the cultivation of good habits of body, by rational attention to the environment both of the workplace and the home, that an enduring defence against not one but all forms of disease is created."

Sickness and Invalidity.

Statistical tables of infectious disease for 1921, which, excluding tuberculosis, are responsible for about 10 per cent. of mortality, are followed by a brief consideration of sickness and invalidity. Two sets of data exist, one relating to school children, the other obtained from statistics supplied under the National Insurance Act. The number of school children inspected in 1921 was, in round numbers, 2,500,000, and about 40 per cent. were found with defects. The chief types of defect were malnutrition (3 per cent.), nose and throat disease (15 per cent.), enlarged glands (6 per cent.), serious dental disease (20 per cent.), anaemia (3 per cent.), deformities, defective hearing, and skin disease (2 per cent. each).

Under the Insurance Act the average annual amount paid for sickness and disablement benefit for men during the last nine years was £4,208,720. These figures represent a total of 9,163,613 weeks of incapacity; for women the corresponding figure is 5,312,461 weeks. The total for both sexes every year is more than 278,000 years of lost time, or the work of 278,000 persons for one year. Data selected from a special investigation of 226 practices in 116 towns give the causes of incapacity in 36,325 cases of illness, and the following table (p. 324) states the results.

Minor maladies, it will be observed, are more notable than tubercle, cancer, or organic heart disease. This fact, taken with all the ailments which do not cause unfitness for work, but in which the doctor is consulted, indicates the opportunity which the Act affords for the practice of preventive medicine.

Insured Persons in Representative Cities—Proportion of Certain Diseases to Total Cases—1916.

Disease.	Total.		Male.		Female.	
	No.	Per 1000 of Total.	No.	Per 1000 of Total.	No.	Per 1000 of Total.
Influenza	3,097	85.3	2,004	90.2	1,093	77.5
Tuberculosis, all forms ...	505	13.9	320	14.4	185	13.1
Organic heart disease	520	14.3	355	16.0	165	11.7
Anaemia	1,157	31.9	74	3.3	1,083	76.8
Bronchitis, bronchial and nasal catarrh, cold, etc.	7,739	213.0	4,988	224.4	2,751	195.2
Pneumonia and other diseases of the respiratory system	537	14.8	395	17.8	142	10.1
Diseases of digestive system	4,766	131.2	2,797	125.8	1,969	139.6
Diseases of genito-urinary system	912	25.1	339	15 3	573	40.6
Diseases of nervous system and special senses	1,775	48.9	1,088	49.0	687	48.7
Skin diseases	1,741	47.9	1,039	46.7	702	49.8
Injuries and accidents... ...	2,871	79.0	2,358	106.1	513	36.4
Abscess, boils, and other septic conditions	2,503	68.9	1,647	74.1	856	60.7
Lumbago, rheumatism, etc. ..	3,181	87.6	2,201	99.0	980	69.5
Debility, neuralgia, and headache	1,999	55.0	855	38.5	1,144	81.1
Malignant disease	65	1.8	45	2.0	21	1.5
Other diseases	2,953	81.4	1,720	77.4	1,236	97.7
Total	36,325	1000.0	22,225	1000.0	14,100	1000.0

Maternity and Child Welfare.

Maternal deaths from sepsis in childbed have ranged from 2.18 per 1,000 births in 1920 to 1.45 in 1921. The movement is irregular, but is in the right direction. From causes other than sepsis the lowest year was 1908 with 2.09, and the highest 1900, with 2.63, but there is really little perceptible change. Of the 3,323 deaths in 1921 the main causes were sepsis (1,171), albuminuria and convulsions (604), haemorrhage (469), other accidents of childbirth (383), and embolism and sudden death (262).

Last year's hot summer supported Ballard's observation that infantile diarrhoea does not begin until the earth thermometer at 4 ft. shows a temperature up to or over 56° F. Factors of importance no doubt are cleanliness, destruction of flies, and the use of dried milk where storage is defective.

The special value of the education of mothers is testified from many districts. For economy's sake new child welfare centres are not being established. As regards the policy to be followed at existing centres, it is evident that the Ministry's experience is leading it in the same direction as in the United States. Treatment is not its function. There should be no giving of prescriptions, nor routine sale of medicines even when paid for at cost price. The sale of foods should be limited to cases in which they are ordered by the doctor and the mother cannot afford to get the article in the usual way. The distribution of free milk through the centre should be avoided as far as possible. In short, it is italicized that the centre's main functions should be "*the supervision of the healthy infant and the education of the mother.*" That is a very important declaration of administrative policy and is on thoroughly sound lines.

Health Visiting.

The number of whole- or part-time health visitors employed by local authorities in England and Wales was 3,378. About 74 per cent. are trained midwives and 67 per cent. trained nurses. "Their work may be of great value or practically useless, according to the way it is carried out," and "no visit can be of real value unless the visitor appreciates its purpose and possibilities and goes about the business of making friends with and of teaching the mother in the right way." No attempt is made to state what proportion of the work approximates to the principle thus set forth, but the emphasis given to it makes clear that the Ministry is of opinion that the work is not universally well done.

Infant Hospitals and Observation Wards.

About forty-five infant hospitals and observation wards have been recognized. They are intended for the less serious but more chronic type of case which cannot remain in the ordinary hospital yet needs institutional treatment, and the number of beds is limited. Once more the educational note is struck. "It is also desirable that the mother shall be taught how to manage her child when it returns home."

In the course of some comments on auxiliary services—day nurseries, homes for healthy babies and for unmarried mothers—it is pointed out that young children should as far as possible not be placed in institutions. Good foster-mothers are the best, and small cottage homes come next. This was the line taken by the Royal Commission on the Poor Law. Homes for unmarried mothers are not being fully utilized; girls cannot be persuaded to stay in them long enough; it may be necessary to close some homes or to use them for different purposes.

(To be continued.)

Scotland.

MILK ADULTERATION IN EDINBURGH.

THE Scottish Board of Health has issued its report on the administration of the Food and Drugs Acts during the year ended September 30th, 1921. Most local authorities give a good deal of attention to sampling and analysis, but in some places only a few articles are sampled, and in others the work is confined to milk. In certain areas samples are taken on only one or two days in the year, but these observations do not apply to the large centres or more important county areas. Of 6,327 "formal" samples (purchased for legal action if necessary) 514 were reported against. In the previous year the corresponding figures were 6,430 and 591, so that the percentage fell from 9.2 to 8.1. Of milk 4,418 samples were analysed, and of these 402, or 9.1 per cent., were found adulterated. The great bulk of them were of new milk, but among a few samples of skim milk, butter milk, and cream powder a certain number were found adulterated, whilst all of the few samples of condensed milk were genuine. The most remarkable fact about the figures is the extraordinary percentage of adulteration in Edinburgh. Whilst Dundee, Glasgow, and Aberdeen had 8.8, 7.3, and 5.8 per cent. respectively, Edinburgh had the amazing figure of 39.6 per cent.—that is, of every five samples taken two were not genuine. Surely the town council of the capital of Scotland will have something to say to this smirching of its fair fame. From the tables we find that the milk samples taken in Edinburgh numbered 149; 59 were adulterated, so that the high percentage cannot be excused as a chance result from insufficient data. In London, as shown in the Report of the Ministry of Health, the percentage of milk adulteration was only 5.1, whilst that for the whole of England was 8.6; the capital, therefore, was better than the provinces, whilst in Scotland the position was very much the reverse.

As to butter, 34 of 411 samples taken were adulterated, but only one of 202 margarine samples was not correct.

Egg powder is specially reported on by Dr. Tocher of Aberdeenshire. Basing his remarks on nine samples he says:

"Results show that the powders contain none of the constituents of eggs, and that therefore the title 'egg powder' is a misnomer. It is well that the public should know the composition of such 'egg powders,' so that purchasers may not be misled into thinking that the powder is in any sense an article of food. The statement that egg powder is the only real substitute for eggs is not warranted from the results of analysis, although the 'egg powder' may possibly be quite useful as a raising agent or for other purposes in cooking."

Among the 191 samples of drugs taken 11 were reported against; of the 191 no fewer than 118 were of cream of tartar, so that only 73 samples of other drugs were taken throughout Scotland, and the Board considers that this reveals very insufficient sampling. Mixtures of malt and cod-liver oil are the subject of an important paragraph. A certificate of analysis of one sample showed the percentage of oil to be only 2.82, while according to the *B.P. Codex* it ought to be 50, and the extract of malt with cod-liver oil should contain 15 per cent. of the oil. The Board communicated with the General Medical Council and received the reply that the question of including in the *British Pharmacopoeia* an emulsion of cod-liver oil and of an extract of malt and cod-liver oil would be considered during the preparation of the next edition, or earlier if an addendum to the *Pharmacopoeia* should become necessary. The report concludes with a series of statistical tables.

THE CENTRAL MIDWIVES BOARD FOR SCOTLAND.

The report on the work of the Central Midwives Board for Scotland for the year ended March 31st, 1922, is signed by the president (Dr. James Haig Ferguson) and the secretary

(Mr. D. L. Eadie), and contains indications of considerable activity—for instance, the Board had thirty meetings (including committees) during the year; down to March 31st 452 midwives were enrolled after passing the examination of the Board, 7 were certified in virtue of *bona fide* practice, and 15 by approved bodies, making a total for the twelve months of 474, which, added to the previous enrolments 4,548, gave a grand total of 5,022. Of this total the larger part consisted of the 3,292 who had been admitted in virtue of certification under Sections 2 and 11 of the Midwives (Scotland) Act of 1915—that is, through holding recognized certificates or in respect of having been in *bona fide* practice at the passing of the Act. The number admitted under these sections is year by year dwindling, and before long they will cease. As evidence of reciprocity between the three parts of the British Isles it was noted that during the past year fourteen midwives holding the certificate of the Central Midwives Board for England after examination and one midwife holding that of the Central Midwives Board for Ireland after examination had been admitted to the Roll in terms of Section 11 of the Act. Nine midwives died during the year.

There were four examinations as usual at three of the centres—namely, Edinburgh, Glasgow, and Dundee—and three at Aberdeen. The greatest number of candidates (247) appeared at Glasgow and 32 were rejected, or 12.95 per cent.; the next largest number (198) were at Edinburgh, where 19, or 9.59 per cent., failed; 100 per cent. of the number (35) at Dundee succeeded in satisfying the examiners; and 4 out of 27 failed at Aberdeen (14.28 per cent.). The average of rejections worked out at 10.86 per cent.; and it was gratifying to find that the pass marks secured by the successful candidates averaged 62 per cent. of the possible. The statement appears in the report that "the Board have continued the regular system of visitation of examinations by selected members of the Board which was instituted last year and it has been found to be beneficial alike to examiner and candidate."

The penal cases were not numerous. As the result of the hearing of the charges the names of five women were removed from the Roll, while in addition three were prohibited from attending women in childbirth in any other capacity. In two of these instances the offence charged was that of failure to send for medical assistance in cases of inflammation of the eyes of the child and failure to notify these cases; in other instances failure to send for medical assistance in the cases of rupture of the perineum, *post-partum* haemorrhage, failure to notify contact with patient suffering from puerperal fever, failure to attend during full period of the puerperium, and in one case leaving the patient before the expulsion of placenta and membranes. There were two suspensions from practice for three months; and a large number of cases of minor offences were dealt with by warnings sent through the medical officers. Prosecutions against women who had been practising as midwives without having been enrolled or after having been struck off had been successfully instituted by the officers of the local supervising authorities, and had had a salutary effect in reducing unqualified practice in certain areas.

An interesting fact noted by the Board was that the practice of midwifery in certain districts was falling largely into the hands of midwives. There were, however, wide differences. In two places (Cockenzie and Prestonpans) 100 per cent. of the total births (probably not many in all) were attended by midwives; in Cowdenbeath, Port Glasgow, and Tain the percentage was from 80 to 90; in Dalkeith it was 75 per cent.; in Glasgow it reached 48.85 per cent.; in Bathgate it was 16.5, in Edinburgh 8.3, and in Moray County only 1.5. These differences point to interesting fluctuations in the distribution of practice between doctors and midwives, not always explicable on general principles. Some interesting statistics are supplied relative to the number of cases in which medical assistance was called in for emergencies, and to the number of cases of ophthalmia neonatorum, of puerperal septicaemia, and of stillbirths.

After meetings with representatives of the Scottish Board of Health, the Board decided, in connexion with the occurrence of ophthalmia neonatorum, to insert a rule making provision for midwives in all cases dropping a 1 per cent. solution of nitrate of silver or other approved silver preparation into the infant's eyes as a preventive. Appendices give the list of institutions at which midwives may be trained and the names of the examiners recognized by the Board.

CONVALESCENT HOSPITAL FOR EDINBURGH.

The Edinburgh Royal Infirmary has (since 1867) had a convalescent hospital at Corstorphine with eighty beds; but through the setting free of a large sum of money left some twenty years ago by the late Mr. David Ainslie of Costerton, East Lothian, new beds for this purpose will soon be available. Mr. Ainslie left instructions that the money was to accumulate for fifteen years, and that then the principal and accumulated funds were to be used to construct a convalescent hospital to be called the Astley-Ainslie Institution. The fifteen years expired some time ago, but the prohibitive cost of building materials and labour delayed progress; now, however, a beginning has been made with the purchase, for a sum of about £70,000, of certain beautifully situated properties in the southern suburbs of Edinburgh. They cover about 25 acres and consist of Canaan House, Canaan Park School, Millbank and Southport Houses, and a ladies' golf course. When all the residences are completed there will be room for between 300 and 400 persons; but in the meantime only the school is to be prepared for use. It will provide accommodation for 50 convalescent women patients along with nurses and staff, and it will be ready by the beginning of 1923. The Governors of the institution will be appointed as follows: five by the Managers of the Edinburgh Royal Infirmary, one each by the Court of Session, the Royal College of Physicians, the Royal College of Surgeons, the Merchant Company, the Chamber of Commerce, the Chartered Accountants' Society, and the Church of Scotland Presbytery of Edinburgh.

England and Wales.

WELSH BOARD OF HEALTH.

THE Minister of Health has made the following appointments (unpaid): Captain Ernest Evans, M.P., to be a member of the National Health Insurance Joint Committee; Professor Ewen J. Maclean, M.D., F.R.C.P.Lond., F.R.S.Edin., J.P., to be the Chairman of the Welsh Consultative Council.

MILK PROSECUTIONS.

We referred at length on August 5th (p. 232) to Circular 325 issued by the Minister of Health with regard to prosecutions for selling milk deficient in fat. The matter has been under the consideration of the Special Committee on Foods of the Society of Medical Officers of Health, and its report was adopted by the Society at its annual provincial meeting at Bournemouth on July 28th. The circular of the Minister of Health recommended that in cases of milk adulteration prosecutions should be instituted only where a series of tests have shown repeated default. The Society in adopting the report of its Committee expressed its regret that such a circular should have been issued and its hope that the Minister on reconsideration will withdraw it. The Society is of opinion that the circular presents no advantages except to the unscrupulous milk dealer. "The honest trader," the report continues, "is amply protected since local authorities are always willing to consider exceptional circumstances. If he still feels aggrieved after a decision (it should be noted that the standard with which a milk seller is required to comply is only one of *presumption*), provision exists whereby, in such instances as those enumerated in the Circular, the milk seller may submit proof to the magistrate, in case of prosecution, that the circumstance is one arising from natural causes and not from wilful tampering with the milk." The report concludes by expressing the opinion that certain of the effects of the Circular will be as follows:

(*a*) Some unscrupulous dealers will take advantage of the concession and continue to extract fat from, or to add water to, milk until that series of tests which will show "repeated default" has been obtained.

(*b*) The probability of a positive series being obtained within a brief period will be decreased if the milk seller ceases to adulterate for a time after a positive result has been obtained. Such intermittency will reduce the probability of default being detected; or with the same intention such milk seller might only reduce the quality of the milk on certain days with obvious effects on the value of the sampling.

(*c*) Informal sampling cannot always be carried out, and the question arises whether in the case of positive results being thus obtained they can be used in court as evidence of "repeated default."

(*d*) Milk is the most important food of infants, and of many invalids, and inferior milk may continue to be supplied with the

knowledge of the local authority to certain persons to their serious detriment—that is, during the time the series of tests to prove "repeated default" are being obtained.

(*e*) The Food and Drugs Acts were never intended to bear this generous trading concession, and if such applies to the milk seller it ought to be held to apply to every other trade sample.

Victoria.

THE AUSTRALASIAN MEDICAL CONGRESS, BRITISH MEDICAL ASSOCIATION.

THE Australasian Medical Congress, which formerly met triennially in the capital cities of Australia and New Zealand, has been reconstituted as an Australasian Congress of the British Medical Association. The first session under the new conditions is to be held in the University of Melbourne from Monday, November 12th, to Saturday, November 17th, 1923, under the presidency of Mr. G. A. Syme, F.R.C.S. The general secretary is Dr. A. L. Kenny, 13, Collins Street, Melbourne, to whom all communications should be addressed. Members of the British Medical Association in Great Britain and Ireland, who may find it convenient to take a long holiday in Australia, will be particularly welcome at the Congress, and may be assured of a generous hospitality. As the great Melbourne Cup Race Carnival commences on Saturday, November 3rd, and terminates on Saturday, November 10th, overseas visitors to the Congress will be able to combine pleasure with business. Further, November is one of the most delightful months of the Australian spring. The sections of the Congress comprise Medicine, Surgery, Obstetrics and Gynaecology, Pathology and Bacteriology, Preventive Medicine and Tropical Hygiene, Ophthalmology, Otology, Rhinology and Laryngology, Neurology and Psychiatry, Diseases of Children, Naval and Military Medicine and Surgery, Dermatology, and Radiology and Medical Electricity. The names of the presidents and secretaries will be announced later.

POST-GRADUATE LECTURES ON NEUROLOGY.

The British Medical Association, Victorian Branch, in conjunction with the University of Melbourne has organized an excellent series of lectures on clinical neurology. The course has been well attended, the lectures were delivered by Dr. J. H. Anderson, Dr. R. R. Stawell, and Dr. Frank Andrew.

MEDICAL STUDENTS AT THE UNIVERSITY OF MELBOURNE.

The number of entries of first-year students of medicine for the current academic year shows a diminution, and for the first time since the origin of the war approximates more nearly to what may be regarded as normal. The following figures, which are not without interest, show the number of first-year students for the respective years:

1913	98	1917	163	1920	202
1914	116	1918	192	1921	151
1915	99	1919	209	1922	110
1916	127				

During the whole of this period no attempt has been made by the University Council to restrict the numbers to those for which the University has accommodation, nor has there been any increase in the fees. The results to the University have been somewhat disastrous, as the teachers have been overburdened, and the true function of a university—the advancement of knowledge by research—has become an impossibility.

Leave of absence for twelve months from last May has been granted to Dr. W. A. Osborne, Professor of Physiology, in order to visit America and Great Britain.

THE International Congress of Comparative Pathology, which was to have taken place at Rome in September, has been postponed till next spring.

THE eleventh Italian Congress of Stomatology will be held in Rome on October 1st under the presidency of Professor Piergili, when the following subjects will be discussed: Lesions of the masticatory apparatus in relation to the laws of industrial accidents, introduced by Professor Beretta; modern progress in facial orthopaedics, introduced by Professor D'Alise; the question of extractions in dento-facial orthopaedics, introduced by Professor Boggio; anaesthesia in dentistry, introduced by Dr. Cavina; modern views in the application of movable and immovable dental prosthetics, by Dr. B. de Vecchis.

Correspondence.

BONE-GRAFTING IN TUBERCULOUS SPINAL CARIES.

SIR,—Mr. Roth, in his letter published in the JOURNAL on August 12th, writes that certain statements made by Sir Henry Gray on the subject of bone-grafting for spinal caries are open to serious criticism, and he proceeds, with emphasis, to condemn the operation without reservation. Sir Henry Gray based his observations on a series of twenty-eight cases, and it so happened that when his paper appeared a communication of mine (made to the Royal Academy of Medicine in Ireland some months ago), dealing with twenty-seven similar cases, was in the hands of the printers. My deductions and results correspond in a large measure with those recorded by Sir Henry Gray, and I expressed an opinion in favour of operation in selected cases.

Before analysing Mr. Roth's "serious criticism," I can make my own position clear by quoting Royal Whitman (1919). He expresses admirably what I believe is the position of most surgeons when called upon to decide between the operative and non-operative treatment of spinal caries.

"One may conclude, therefore," he says, "that operative treatment, although of the greatest value in selected cases, particularly in the adolescent or adult class, is not to be undertaken as a routine measure in the treatment of Pott's disease, but that it is distinctly supplementary to conservative treatment."

And again: "Operations of this character are more likely to be successful in the curative sense in the adolescent or adult class than in early childhood."

I have read Mr. Roth's letter paragraph by paragraph.

1. He objects to the statement that fixation is essential to success, and adds that physiological rest is prevented by absolute fixation. He contends that the argument of easy operative fixation as against difficult mechanical fixation therefore does not arise. I wonder how many experienced orthopaedic surgeons will agree with Mr. Roth on the question of absolute fixation and physiological rest.

2. Sir Henry Gray points out that the behaviour of an abscess in cases of spinal caries treated by operation is uncertain. Mr. Roth reads into this statement the meaning (abscess, he says, occurs in 48 per cent.) that nearly half the cases derive no advantage from operation as compared with non-operative treatment. "On Sir Henry's own showing," he says, "even if he is right, nearly half the cases would not be cured any quicker by operative methods." There was nothing in Sir Henry's paper which conveyed this meaning to me. I have had four cases of spinal abscess, treated exhaustively without success, get rapidly well after bone-grafting the diseased spinal segment. I believe it was the absolute fixation which brought about so happy a result.

3. Sir Henry Gray quotes authorities and statistics which appear to show the higher mortality following the conservative form of treatment. Mr. Roth could have perhaps helped us in this matter, for accurate statistics with regard to mortality in this disease, for obvious reasons, are difficult to obtain. Whitman, according to Gray, said (in 1901), "At least 20 per cent. of all patients die during the progress of the disease." "Could he have not quoted from a more up-to-date book," says Mr. Roth, "as, for example, Rendle Short's *Index of Prognosis*, 1918, second edition, where we are told that we may take it that the mortality is about 5 to 10 per cent.?" I have before me Royal Whitman's book (1919), kindly sent by the author, and the 20 per cent. statement is repeated. If Mr. Roth desires still more recent literature the Mayo Clinic's 1921 volume has just arrived from the publishers. He will find in this a study of 166 patients treated by bone-grafting for spinal caries, and a statement from Henderson that the results of operative are better than the results of non-operative treatment. Henderson concludes his paper by saying, "I shall continue to advise operation in adults."

4. Mr. Roth says, "He [Sir H. Gray] surely must know that it is usually the onset of deformity which first draws attention to the presence of disease." Surely Mr. Roth does not intend this statement to be taken literally. It is common knowledge that the disease is, and should be, recognized in most cases long before deformity occurs. He quotes Rollier in support of the statement that in *all* active cases the deformity can be *entirely* reduced except in the cervical and lower lumbar regions, and pleads, "Can we then advise patients to have an operation to cure (*sic!*) them, and thereby

force them to remain humpbacked for life, when another form of treatment can make them *perfectly* straight?" (the italics are mine). How many surgeons can promise all kyphotic patients complete restoration when the disease is active? "'Tis a consummation devoutly to be wished," but I will quote Whitman once again: "When the deformity is present," he says, "it can be remedied only in part, and it may be difficult even to check its progress." At operation considerable reduction of deformity can often be accomplished, but I take it that most surgeons obtain all correction possible by postural and other methods before introducing the graft in cases selected for operative treatment.

5. Mr. Roth concludes his letter with a reference to the operation of craniectomy, which was tried and abandoned as a treatment for microcephalic idiots—"their [the surgeons'] eyes were opened and they were able to perceive the error of their ways." "Is it too much to hope," he asks, "that this history may soon repeat itself?" There is another side to this picture and it teaches a second lesson. In the past every step forward in surgery and medicine was obstructed by professional die-hards—as, for example, the introduction of antiseptics and anaesthetics. It is the same to-day: the die-hards are content if surgery and medicine remain in the well-worn rut.—I am, etc.,

Dublin, August 13th. W. I. DE C. WHEELER.

SIR,—May I enter a protest, if such be necessary, against the letter by Mr. Bernard Roth in the JOURNAL of August 12th? The question of the correct treatment of spinal caries is not yet settled, and I do not think that Mr. Roth's letter contributes in any way towards its settlement. While attempting to throw doubt on the value of the statements made by Sir Henry Gray, he asks us to accept without any question the statistics given by Dr. Rollier and to be guided by them. Is it not possible that there may be other optimists than Sir Henry Gray, and that Dr. Rollier may be one of them? Whatever may be the value of Dr. Rollier's figures, it is limited by the fact that it is impossible for us in this country to treat cases of spinal caries under the same ideal conditions as he does.

I have treated several cases without fixation of any kind, and found the method to be of value only when the disease had become quiescent, and when the weather conditions, particularly as regards the amount of sunshine, were more favourable than they usually are.

I have had several cases of abscess in which fixation, exposure to the sun, and aspiration (repeated when necessary) failed to give a good result, and in which the abscess was rapidly absorbed after a bone graft had been inserted by Albee's method. I regret that I have not the exact figure at hand, but I have operated on over twenty cases and there has not been any mortality. Operation should certainly be done before deformity has occurred. Usually the deformity is slight when the patients are first seen, and it can by a few weeks' postural treatment be modified to such an extent as not to be noticeable. With regard to cases where advanced deformity has taken place, when one reflects on what has actually happened to the body tissue of two or three vertebrae it is difficult to accept Mr. Roth's statement that "Rollier has shown that in all active cases the deformity can be reduced except in the cervical and lower lumbar regions."

Mr. Roth wonders "if anything more is needed to open your readers' eyes to the real state of affairs" than Sir Henry Gray's account of four cases in which the result of his treatment has been unsatisfactory. I should think that the obvious answer to this is that we need an equally candid account of a series of cases treated, under similar conditions, by non-operative methods.

We are not likely to arrive at a method which will cure every case of spinal caries, but I think we have in spinoplasty a method of treatment which, when used with judgement and discrimination, is of very great value.—I am, etc.,

ALEX. MITCHELL,
Surgeon, Royal Aberdeen Hospital for Sick Children.

Aberdeen, Aug. 13th.

THE TEACHING OF PSYCHOTHERAPY.

SIR,—I feel I am to be congratulated in that my letter has brought forth replies from two such authorities as Dr. Potts and Dr. Crichton Miller. I am sorry that Dr. Potts does not look upon psychotherapy as a science. That it is also an art, I agree; but if I did not believe that it were founded on sound scientific principles I, for one, would have nothing more to do with it. What I do object to is the attitude of mind which would make it a mystery as well. I believe that a certain amount of team work is possible in psychotherapy as in other branches of medicine. That the relations between a patient and his analyst must be of a peculiarly intimate and confidential kind goes without saying, but this should not be a bar to collective investigation in the way I suggested by men who approach the subject in a strictly scientific spirit. In the course of the analysis of their dreams they would have to learn to overcome their own repressions and to stand mentally and morally naked before each other; but once a man has progressed far enough to admit of the possibility of unsavoury complexes within himself the scientific frame of mind would carry him through. In such an investigation carried out by normally well-balanced individuals the question of transference would not arise. After all, I do not believe that every dream of the normally adapted individual shows necessarily either sexuality or antisocial tendencies. There are many egoistic impulses in us all which do not come under either category, and to my mind the problems of dreaming can be better studied in the normal than in the pathological.

I was very interested in Dr. Crichton Miller's account of the method of teaching employed at the Tavistock clinic. It is evidently on very sound lines. If such recognized centres could be allowed to grant diplomas the possession of such would be a valuable guide to the general practitioner in the selection of a specialist, although due provision should be made for those older men who, in the face of far more opposition than exists to-day, upheld the banner of psychotherapy in the years before the war. In conclusion, I am rejoiced to read that at the recent meeting of the British Medical Association in Glasgow a resolution was passed by the Section of Neurology and Psychological Medicine advocating the addition of psychology to the student's curriculum. This marks a big advance in the right direction.—I am, etc.,

Birmingham, Aug. 12th. R. MACDONALD LADELL.

THE CONTROL OF BIRTH CONTROL.

SIR,—The accumulated evidence is now overwhelming, both statistically and from many recorded individual experiences, that the present practice of voluntary birth control is entirely baneful in its dysgenic results. The regularity and care required for its successful employment renders it utterly ineffective among the worst classes, while the most highly civilized are the most easily tempted to substitute personal convenience for possible children. It is therefore high time for the scientific control of birth control, and some such definite system should be inaugurated, as, for example, the following:

1. A central committee should be appointed of medical men of approved status who should control the whole subject of birth control and decide the suitability of cases referred to them.
2. Mental defectives and habitual criminals should be compulsorily sterilized—for example, by operative ligation.
3. In cases unable to maintain themselves or their children the woman should be temporarily sterilized by compulsion for varying periods—for example, by the insertion of the spring wish-bone pessary.
4. The open sale of contraceptive books and mechanical devices should be prohibited in public places, such as general stores, etc., so that no unnecessary temptation should be put before parents to sacrifice their potential children to personal convenience or luxury.

Indiscriminate propaganda by irresponsible lay persons, journalistic or otherwise, should be similarly dealt with for similar reasons, as is now being done in France since the war.

5. Cases of normal people specially desiring contraceptives for urgent medical or economic reasons should be referred through their family doctor or welfare centre to the above central committee, who should supply limited quantities for limited periods to necessary cases, thus establishing control analogous with that of morphine and cocaine.
6. Where both parents were absolutely determined to employ contraceptives without justification, then these might be supplied in return for a stiff graduated tax, which should be applied for the benefit of larger families of the same class.
7. Stiffening of parental instinct should be stimulated, especially in the desirable classes—for example, professional—to cope with the attack of modern city conditions *plus* contraceptive inducements against their survival rate, on the analogy of the production of immunity against a lethal virus with a selective action.
8. The building up of a protective tradition is well seen in the Jewish code dealing with this matter, which constitutes a racial asset favouring their survival over surrounding groups less developed in consciousness.

The above is only a framework requiring much fuller elaboration and definition before becoming workable, but

something of the sort is urgently necessary in national interests.

The recent annual baby week, with its infant welfare schemes, and indeed all the organization for reduction of infantile mortality, are somewhat farcical if we remain inactive with regard to the poor survival rate of the professional and similar classes. It seems the height of inconsistency and incongruity that the birth prevention of more than half of the possible children of the better classes should excite less repression than the abortion of prostitutes and imbeciles, which is a criminal offence.—I am, etc.,

R. H. VERCOE, M.R.C.S., D.P.H.

London, N.W.

STERILIZATION OF MENTAL DEFECTIVES.

SIR,—With reference to Dr. Arnott Dickson's letter in the JOURNAL of August 12th (p. 285), I would refer him to a brochure entitled *American Sterilization Laws*, by Bleecker van Wagenen, issued by the Eugenics Education Society, London, and another entitled *Eugenical Sterilization in the United States*, by Harry S. Laughlin (1920), issued by the American Social Hygiene Association, 370, Seventh Avenue, New York. Later information will shortly be available in a book by Harold Cox, editor of the *Edinburgh Review*, which is now in process of publication. By the courtesy of Mr. Harold Cox I am able to quote the following particulars:

State.	Date Enacted.	Permission of Relatives.	Total No. of Operations.
Indiana	1907	Not required	1,200
Washington	1909	Not required	1
California...	1909	Not required	2,558
Connecticut	1903	Not required	27
Iowa...	1911	Not required	49
New York*	1912	Not required	42
North Dakota	1913	Not required	23
Michigan†...	1913	Not required	1
Kansas	1913	Not required	54
Wisconsin...	1913	Not required	76
Nebraska	1915	Required	155
Oregon‡	1917		127
Total			4,313

* Repealed 1920.
† Declared unconstitutional 1918.
‡ State refuses to issue marriage licence unless he or she submits to sterilization.

—I am, etc.,

London, W., Aug. 12th. NORMAN HAIRE.

HAEMOLYTIC AND WATER FEVERS.

SIR,—In your review of our article dealing with haemolytic and water fevers (EPITOME, April 1st, 1922, p. 52), you state that we conclude that no reliable evidence of pure haemolytic fever exists, and that, in consequence, the fever in paroxysmal haemoglobinuria must be due to some other cause.

This does not give our conclusion correctly. What we state is that the fever is due to some *unknown* cause. The evidence brought forward by Yamakami of being able to produce fever in rabbits by inducing haemolysis simply we showed to be unreliable. We are not prepared to say that haemolysis is not concerned in the production of the fever, but if this is the case no evidence has yet been adduced to prove it. No experiments have been done yet, so far as we are aware, to ascertain the effect of distilled water haemolysis in animals suffering from chronic infections. We believe it possible that the haemolysis in paroxysmal haemoglobinuria in the presence of an infection might induce fever, and many of these patients are known to be syphilitic. What we stated before and now restate is that no reliable evidence of pure haemolytic fever exists and that the cause of the fever in paroxysmal haemoglobinuria is still unknown.

It has already been shown by Hort and Penfold that a quantity of bacteria, unable in itself to produce fever in the rabbit, will produce a well-marked fever if it be administered intravenously in distilled water, or if the animal be sensitized by the previous injection of distilled water. This, however, cannot be looked upon as a haemolytic fever simply, for the bacterial poison must have been introduced simultaneously with or about the same time as the water. Moreover, it has not yet been proved that the sensitizing effect of the water is due to the haemolysis.—We are, etc.,

W. J. PENFOLD,
D. G. ROBERTSON.

Commonwealth Serum Laboratories, Royal Park, Victoria, June 23rd.

PRACTICAL PSYCHO-ANALYSIS.

SIR,—In your issue of July 15th there appears a review of my book *Practical Psycho-Analysis*. In this review the mode of criticism adopted by the writer is much to be deplored and deprecated. As, however, he is not the only sinner in this respect, perhaps you will generously grant me the privilege of some of your valuable space in order to put him and other sinners right in this very important matter—to lead them along the path of righteousness to the goal of reformation.

The main functions of criticism are, or should be, to illuminate and to inform. If it is necessary to destroy, the destructive process should be followed by a reconstruction. Purely destructive criticism is worthless. A critic, too, should avoid careless writing, cultivate a clear and literary style of composition and be alive to the responsibilities of the high duties of his office.

The following extract from the review in question, affords an excellent example of careless writing and of purely destructive criticism at the same time—

"Some of his explanations are confusing and may fail to convey any meaning. This is particularly the case in his treatment of *libido*, *affect*, and *desire*, much of which leaves the reader puzzled and far from clear in his mind as to the distinctive meanings of these terms."

Naturally, if the reader is puzzled he cannot be "clear in his mind." The criticism too is purely destructive and therefore worthless. To make it of any value, the writer should substantiate his statements by quoting from my book examples of confusing explanations, and he could then further add to the value of his criticism by substituting clear explanations for those that he finds confusing. He does none of these things, and therefore his criticism is worthless.

But the delinquencies of this gentleman who has done me the honour to review my little work, do not end here. He attributes to me expressions which I did not use—for instance, the expression "repressed experiences." For the sake of clarity it will be better to quote this passage in full. The reviewer writes:

"It is thus misleading to describe the 'preconscious' as the seat of repressed experiences, which can only be brought into consciousness indirectly, and to state that the mental processes included therein are concerned with the primary instincts and are largely in the nature of sexual wishes."

I never use or never have used the phrase "repressed experiences" as it is likely to give rise to ambiguity; for an experience may be an occurrence, an actual physical happening, in which case it cannot even be conceived of as being repressed, or it may be a mental process or a group of mental processes, for example, a phantasy—in either of which cases it may be repressed if it is intolerable to the personality. Also if it happens to be a mental process or a group of mental processes of the nature of an unpermitted sexual wish, it very often is repressed into the preconscious and as it is sexual it necessarily is concerned with the primary instincts.

If I leave unnoticed other observations of your reviewer, I feel sure you will understand that I do this out of regard for your space. It is for the same reason I compress my remarks. Almost every proposition he advances is of the nature of an unsupported opinion. Criticisms of this type are not worth the paper they are written on—they have no scientific or any other value and if you will excuse me, Sir, for saying so, they have no proper place in the columns of the BRITISH MEDICAL JOURNAL.—I am, etc.,

Shotley Bridge, Aug. 7th. H. SOMERVILLE.

"DOCTORS IN COUNCIL."

SIR,—I am glad that Dr. Peter Macdonald has drawn attention (August 12th, p. 284) to the supposed value of honorary hospital appointments. At the present time especially it is constantly being brought forward by laymen as an argument against paying the staff. There is no doubt that the advantages, repute, and profit said to attach to these appointments are much exaggerated; it is apparently always forgotten that what value there is is entirely potential and depends on the personality of the holder. This appointment is indeed his opportunity; he might use his chance for unremunerative scientific research, or for professional work on behalf of the patients in the hospital which may lead to lucrative practice. These appointments may be, as the *Manchester Guardian* says, "The entrance gates to most lucrative fields of private practice," but not everyone who passes through these gates

reaps this particular harvest; in any case if one does gather a crop that he sells at a good profit in the open market it is only by his skill and his industry that he is enabled to do so.

In the case of the smaller hospitals, so-called cottage hospitals, there are no gates open only to a select few, and leading to these "lucrative fields of practice"; every practitioner working there cultivates a crop for his own consumption—there is no outside market for it. In other words, a member of the staff of a cottage hospital attends there mostly his own private patients, the work he does there brings him little, if any, reputation outside the district in which he practises and no lucrative work in the way of consultations or operations. The work he does there is an advantage to him in that it makes him a more efficient practitioner, but this is equally an advantage to all his patients, and if both he and his patients do benefit the benefit is strictly proportioned to the industry and skill with which the doctor has pursued his hospital work.

There can be no doubt that even in the central hospitals these appointments should in the interests of all be open to as many as possible, and if the holder of one fails to make proper use of his opportunity there should be some means of replacing him by another who may do better.—I am, etc.,

Bradford-on-Avon, Aug. 14th. CHAS. E. S. FLEMMING.

MARRIED MEDICAL WOMEN.

SIR,—Allow me to back up the remarks of Dr. Marion Mackenzie in your issue of May 20th, received rather late, as I am not in England. As a fellow Scotswoman, I admire her for speaking her mind. As myself a doctor of twenty-five years' and a mother of seventeen years' standing, I cordially agree with her remarks on the futility as well as the injustice of debarring a medical woman from certain posts because of her being married. The affairs of the married are only fully understood by the married. If the married treat the single, at least they have themselves been single once. Medical men usually find marriage benefit their practice. Simpson, for example, had to marry in order to obtain the chair of obstetrics at Edinburgh. This is not only a question of propriety—it is a feeling that the man who most nearly realizes what marriage and maternity mean to a woman is the man who unites the feelings of husband and father to the knowledge of the physician. Women have not this knowledge either till they marry. Medical women are all the better for having in their ranks, as they have had from the first, a certain number of married women. When all is said and done, married people frequently do not care to enter into many medical details with bachelors and spinsters.

There are signs that the much tried mother is rebelling against the constant dictation and inquisition into all her doings carried on by spinsters and sometimes by bachelors. I saw a book once on a stall entitled *A Book for Mothers by a Mother*. There is no doubt that patients frequently believe more in a doctor who is a parent—and faith counts for something still. The Chinese, indeed, regard medicine as an old man's and preferably as an old woman's trade. If "knowledge through suffering entereth" there is something to be said for this view. The multiplication of books for junior practitioners on sex surely proves the same. The money for maternity and child welfare clinics is found by townsfolk who, as a rule, are married; I fail to see that posts in charge of wives and children should be necessarily used as mere charities for childless women. There are many people who think that all such clinics, and also venereal hospitals, should be officered solely or chiefly by married people who are also parents. Many clinicians have sounded a warning against the mere laboratory worker. From the economic point of view, the wives of to-day complain, "First the spinsters do our men out of a job. Then they forbid us wives and mothers to earn. Then they turn round and grab such children as we dare to have, and tyrannize over them and us. Are we to be mere machines for bearing children?" It is the home we are fighting for. Single professional people can earn a living—so can husband and wife, if they part and abandon the children. The mother, and the father in his measure, who have watched children develop, with eyes made wise by love and also sharpened by professional experience, know more than all the bachelors and spinsters put together, with the rare exception of "born" mothers and a very few "born" fathers, such as Froebel, Barnardo, Ozanam, and Vincent de Paul. The modern system of passing the child on from monthly to child's nurse, from unmarried woman doctor and health visitor to school medical officer, usually unmarried also, and nurse, and the kindergarten teacher to the preparatory and so to the public school, leaves the parent and family doctor and the priest (if any) the only persons who know the individual from birth to adult life; and of these the parent alone as a rule knows the family history. In the medical parent these opportunities are united. Is the public as a whole to lose the advantage of their experiences, or anyhow when that parent is a mother?

If the objection to married women is their possible state of health, may I inquire if Hunter was immediately made to resign on account of his aneurysm? The public in general benefits so much from the devotion of doctors to duty in spite of ill health that it seems a little absurd to press this point. Woman is usually penalized all round. The Post Office Insurance people, for example, and some others, go on making a woman pay at the rate of labour risks long after the climacteric. The yellow, black, and brown races do not penalize marriage. Are we sure enough of our ground to justify all or any of us in so much petty regulation as goes on to-day? If the plea for dismissal is the woman's health, let her husband and herself settle this—anyhow, in the case of a medical woman. If she cannot take care of her health, who can? And is the public always so considerate for doctors' health? Can temporary leave not be given?—I am, etc.,

Durban. MARGARET LAMONT.

THE ANTIVIVISECTION SOCIETY: AN APOLOGY.

SIR,—In the May, 1922, number of a journal, *The Animals' Defender and Zoophilist*, issued by the Antivivisection Society, there appeared an article, written by the Hon. Mr. Stephen Coleridge, in which it was suggested that the annual parliamentary return, made by the Home Office, of experiments on living animals performed by licensees under the Act 39 and 40 Vict. c. 77 (known under the short title of "The Cruelty to Animals Act, 1876") during 1920 represented "a deliberate *suggestio falsi*." The article proceeded with the suggestion that, with the connivance of the Home Office, certain licensees under the Act had made false returns of experiments performed by them on living animals during the year 1920. As the result of certain action taken by the solicitors representing one of the licensees referred to in the Hon. Mr. Stephen Coleridge's article, the following retractation of, and apology for, the untrue and libellous suggestions made therein was published in the July and August numbers of *The Animals' Defender and Zoophilist*:

APOLOGY TO MR. A. G. FOULERTON, F.R.C.S.

In the issue of this journal for last May, on pages 7 and 8, appeared an article entitled, "Is it only innocent credulity?"

The article contained statements which have been understood as accusing Mr. Foulerton of having knowingly signed false returns in returns made by him to the Home Office (in regard to experiments made on living animals under licences granted to him pursuant to statute), and of having committed criminal offences.

Our suggestions to that effect were made without any foundation, and we are satisfied that there is absolutely no justification for any accusation of the kind.

We apologize to Mr. Foulerton for having made the statements complained of, and sincerely regret the pain and annoyance which he has thereby suffered.

—I am, etc.,

London, W.C., Aug. 8th. ALEX. G. R. FOULERTON.

SIMPLE GOITRE.

SIR,—Gastro-intestinal infection as a causative factor in simple goitre is, on the authority of Lieut.-Colonel McCarrison (BRITISH MEDICAL JOURNAL, April 22nd, 1922), an admitted fact. His example of the European school in India, which became entirely free from goitre on being provided with a bacteriologically pure water supply, is sufficiently convincing.

In rural districts in this country it is not always possible, from economic and other reasons, to provide a pure water supply. The use of thymol and beta-naphthol has proved to be capable of causing the disappearance of recent goitres in young subjects (*The Thyroid Gland*, McCarrison, p. 94). The administration of these, however, requires constant supervision, which is somewhat difficult in a scattered rural population.

In a district where endemic goitre is very prevalent and the water supply indifferent I have used in a number of cases during the past twelve months keratin-coated capsules of oxygenated hydrocarbons of high boiling point of the tar-acid series from which the phenols and cresols have been distilled. The resultant antiseptic is of high germicidal efficiency (Rideal-Walker coefficient 30) and of low relative

toxicity to carbolic acid (1 to 90). I have found that in the majority of early cases treatment extending over a period of from four to six weeks causes a complete disappearance of the swelling. The capsules may be given for prolonged periods without giving rise to any ill effects.

Boiling all drinking water is not sufficient to eliminate the possibility of soil infection in an infected area.

In cases of long standing the administration of small doses of iodine to supply the iodine needs of the body and to relieve the strain on the thyroid hastens the reduction of the goitre.

—I am, etc., R. HENSLEIGH WALTER, M.B.

Stoke-under-Ham, Somerset, Aug. 12th.

TOBACCO SMOKE AND CANCER.

SIR,—In your issue of August 5th Colonel Duer quotes a New York surgeon as saying that he had never met with a case of malignant disease of the lips, tongue, mouth, or throat in a non-smoker. In common, doubtless, with all laryngologists, I have had numerous cases in patients who had never used tobacco. I have recorded six cases of intrinsic cancer of the larynx in females who had been non-smokers all their lives. In each case the diagnosis was confirmed by the microscope. They did not chew betel-nut or indulge in any similar habit, and they were either teetotalers or extremely temperate drinkers.—I am, etc.,

London, W., Aug. 15th. ST CLAIR THOMSON.

NATIONAL ASSOCIATION OF OPTICIANS.

SIR,—On July 10th I received a communication from the National Association of Opticians inviting me to examine their candidates in the anatomy and the abnormal conditions of the eye. I have found reason to suspect that this was probably part of an insidious attempt on behalf of this society to secure recognition for their members and to obtain for them a status similar to that which is possessed by midwives.

As a practising ophthalmic surgeon I have therefore thought it advisable to raise this matter in your columns lest others should be approached with the same object. We do not want this new class of practitioner. Recognition by the State, together with certificates of competence from members of our profession, would still further confuse the lay mind in its power to distinguish between an ophthalmic surgeon and the optician.—I am, etc.,

Manchester, Aug. 3rd. CYRIL JACOBS.

*** For a craft to seek to ascertain or secure the efficiency of its craftsmen is not reprehensible. Two points are, however, essential: (1) that the craft shall have a well-defined and accepted sphere; (2) that those who practise it shall not pretend to be other than they are. In both these respects the movement initiated by the National Association of Opticians needs to be carefully watched, and it is desirable that further information with regard thereto should be supplied by our readers.

Obituary.

MARRIOTT LOGAN ROWAN, M.D.,

Medical Superintendent of Derby County Asylum.

HIS many friends will read with regret of the death of Dr. Marriott Logan Rowan, which occurred with tragic suddenness at St. Anne's-on-Sea on August 6th. He had been in poor health for some time, and had left Derby only two days before his death. Dr. Rowan was born at Carrickfergus, co. Antrim, in 1871, and was educated at Queen's College, Belfast. He graduated B.A. (with honours), and M.B., B.Ch. at the Royal University of Ireland in 1900; in 1903 he graduated M.D., and a year later he became assistant medical officer at Derby County Asylum. He was appointed medical superintendent in 1915, a post he filled with much distinction till the time of his death. The many improvements that followed his appointment bear witness to his deep interest in the staff and patients, and a touching tribute to his memory was the spontaneous gift of a beautiful wreath from the patients of each side of the institution. Possessing a generous and kindly nature, to all who were privileged to know him his death comes as a personal loss. Much sympathy has been extended to his widow and two little children.

WE regret to announce the death of Dr. RICHARD CHARLES MASON POOLEY, which occurred at his residence, 20, Park Road, Regent's Park, on July 30th. Dr. Pooley was born in Ireland in 1848, and received his medical education in Dublin; he took the diplomas of L.R.C.S.I. and L.R.C.P.I. in 1871, and the M.R.C.P.I. in 1900. In his earlier days Dr. Pooley had a busy and successful career as a surgeon in Rochdale, and held the appointment of honorary surgeon to Rochdale Infirmary; he was the author of a number of contributions to this journal on medical and surgical subjects. He was a justice of the peace, a Fellow of the Royal Society of Medicine, an old member of the British Medical Association, as well as a local representative of the London Panel Committee, in the work of which he took an active interest. At one time he was a keen Territorial officer, and retired from the R.A.M.C.(T.) with the rank of major; he held the Volunteer Decoration. His kindly nature and his professional ability made him beloved and respected by all who came in contact with him.

Dr. ANDREW MURRAY NEETHLING, who died recently at Pretoria, was born in Cape Colony, and educated at Edinburgh University, where he graduated M.B. and C.M. about 1883, and subsequently took the degree of M.D. After studying on the Continent, he returned to South Africa, where he was in practice successively at Barberton and at Lydenburg until the South African war, throughout which he served. After the war he sat in the Cape Colony Parliament as member for Beaufort West. In 1914 he served under General Botha with the rank of colonel in the campaign which reduced German South-West Africa. After the capture of the capital, Windhoek, he was appointed chief medical officer of the conquered territory. He married a daughter of the late Mr. Duncan Wilkie Paterson, S.S.C., of Edinburgh, and leaves a widow and three children. His two elder sons served with him in the campaign in S.W. Africa, where the elder was killed in action at the pass of Kakanas.

Dr. FREDERICK HAYCRAFT BERRY of Watford died on July 29th, aged 66. He was the eldest son of the late Dr. H. T. Berry, of Amwell Street, London, and received his medical education at Guy's Hospital Medical School. He took the diploma of M.R.C.S. in 1878 and graduated M.B.Lond. with honours in 1880 and M.D. in 1886. After serving as house-physician and resident obstetrician at Guy's Hospital he joined the late Dr. A. T. Brett in practice at Watford in 1883. He took great interest in the establishment of the Watford District Hospital, of which he was for many years honorary medical officer; on his retirement from that post was appointed honorary consulting surgeon. He was president of the Watford and West Herts Medical Society, a member of the West Hertfordshire Division of the British Medical Association, and a representative for Watford on the Herts Panel Committee. Among his medical appointments were those of medical officer to the London Orphan School, the Post Office, and the London and North-Western Railway. He was a governor of the Grammar School and a trustee under the Morrison Charity. During the war his eldest son, Lieutenant P. H. Berry, R.A.M.C., lost his life in South Africa in an heroic attempt to save a private soldier from drowning.

WE regret to announce the death, on July 30th, of Dr. CHARLES MITCHELL MACQUIBBAN, J.P., who was the oldest medical practitioner in Aberdeen, having been born in that city eighty-nine years ago. He was educated at Aberdeen University, graduated M.B. in 1861, and M.D. and C.M. in 1883; he took the diploma of L.R.C.S.Edin. in 1863. During the Crimean war he volunteered for service in the army, but as hostilities were approaching a termination his services were not required. In 1861 Dr. MacQuibban began a long military career by becoming attached as assistant surgeon to the 7th Volunteer Battery of the Aberdeen Artillery; he was later attached to the Gordon Highlanders (Militia), and finally retired with the rank of surgeon lieutenant-colonel in 1899. In 1913 he was appointed senior medical officer of the National Reserve. He was a very well known figure in the community, and enjoyed the genuine affection and respect of all classes. A few months ago he fell from a tramcar, and from the effects of this accident he never recovered. He is survived by two daughters.

WE regret to record the death, suddenly, on August 8th, of Dr. WILLIAM ROBERT WILLIAMS, of Machynlleth, Montgomeryshire. Dr. Williams was educated at Edinburgh, and took the diplomas of L.R.C.P. and L.R.C.S.Edin. in 1888. He was one of the best-known medical practitioners in his district, and held many public offices. He was a justice of the peace, honorary surgeon to the local cottage hospital, assistant medical inspector of schools for the county, and an ex-chairman of the local urban district council. He held a commission as Captain R.A.M.C.(T.), and was attached to the 7th Royal Welsh Fusiliers. He was a member of the British Medical Association. His funeral was attended by a firing party of the 7th Royal Welsh Fusiliers and by a very large assembly of people. He leaves a widow, two sons, and two daughters, with whom much sympathy is expressed.

The Services.

THE King of Egypt has conferred the Order of the Nile (fourth class) upon Captains Eric D. M. Heriot-Hill and Stanley Arnott, R.A.M.C., in recognition of services rendered during the operations against Aliab Dinkas in the Mongalla Province.

DEATHS IN THE SERVICES.

Surgeon Commander James Garfit Wallis, R.N., died recently at Plymouth. He was educated at the London Hospital, where he was Buxton Scholar, and took the M.R.C.S. and L.R.C.P.Lond. in 1897, and the M.D.Lond. in 1899. After filling the posts of house-physician and clinical assistant in the aural, ophthalmic, and skin out-patient departments at the London Hospital, and assistant house-surgeon at Poplar Hospital, he entered the navy as surgeon, taking the prize for tropical diseases at Haslar. He attained the rank of surgeon commander on February 25th, 1914, and in April, 1920, was appointed health officer of the port at Devonport.

Lieut.-Colonel John Joseph Falvey, R.A.M.C. (retired), died on May 21st, aged 70. He was born at Tralee, educated at the Ledwich School of Medicine, Dublin, and took the L.R.C.S.I. and L.A.H. in 1876, and the F.R.C.S.I. in 1886. He entered the army as surgeon on August 10th, 1878, and became lieutenant-colonel after twenty years' service, and retired in 1900. He had a long list of war service: the Boer war of 1881 in the Transvaal, including the defence of Lydenburg, mentioned in dispatches; Egyptian war of 1882, medal and Khedive's bronze star; Sudan, 1884–85; Nile campaign, with the heavy camel corps, action of Abuklea, and engagements during return to Korti, two clasps; and South African war, 1899–1900, Queen's medal with clasp.

Lieut.-Colonel James Young, Bengal Medical Service (retired), died at Bedford on July 13th, aged 76. He was the son of John Young, of Bathgate, West Lothian, and was educated at Edinburgh, where he graduated M.B. and C.M. in 1868. He entered the I.M.S. as assistant surgeon on March 30th, 1872; he became surgeon lieutenant-colonel after twenty years' service, and brigade surgeon lieutenant-colonel in 1897; after officiating for some time in the administrative rank as A.M.O. of the Calcutta district he retired, with an extra pension, on March 31st, 1902. He served in the Burma war of 1885–86, taking part in the occupation of Manda'ay, and received the frontier medal with a clasp.

Colonel John Donald Alexander, C.B.E., D.S.O., Army Medical Service (retired), of Bideford, died in Queen Alexandra's Military Hospital, Millbank, on July 9th, aged 55. He was born at Callan, in Ireland, on April 11th, 1867, the eldest son of the late Very Rev. John Alexander, Dean of Ferns, and was educated at Trinity College, Dublin, where he graduated M.B., B.Ch., and B.A.O. in 1889. He entered the R.A.M.C. as surgeon lieutenant on January 30th, 1892, attained the acting rank of colonel on March 23rd, 1916, while holding the post of A.D.M.S. of a Division, was confirmed in that rank on December 26th, 1917; placed on temporary half-pay on account of ill health on November 26th, 1919, and retired on February 3rd, 1920. He served on the North-West Frontier of India in the Tirah campaign of 1897–98, taking part in the capture of the Sampagha and Ashanga passes, the reconnaissance of the Saran San, operations round Dwatoi, against the Khanikhel Chamkannis, and in the Bazar Valley, and in the action at Shinkaman, receiving the frontier medal with two clasps. In the South African war of 1899 to 1902 he served in the relief of Ladysmith, action at Colenso, operations on Tuge'a Heights, action at Pieter's Hill, the relief of Mafeking, and the action at Frederikstadt, was mentioned in dispatches, and received the Queen's medal with five clasps, and the King's medal with two clasps. His services in the recent war of 1914–18 were mentioned in dispatches in the *London Gazette* of January 4th and May 29th, 1917; he received the D.S.O. on June 3rd, 1917, and the C.B.E. on June 3rd, 1919.

Captain Ernest Neville Keys-Wells, R.A.M.C.(T.F.), died in London on July 30th. He was the fourth son of the late Rev. William Keys-Wells, of Clifton Rectory, Penrith, and was educated at Edinburgh, where he graduated M.B. and C.M. in 1888. He served as a civil surgeon in the South African war, in the operations in Natal, receiving the Queen's medal with a clasp. In the late war he held a commission as captain R.A.M.C.(T.F.) in the 3rd London General Hospital from March 19th, 1915.

Medical News.

SIR WM. THORBURN, K.B.E., C.B., C.M.G., F.R.S., has been appointed a member of the Advisory Committee under the Administration of the Cruelty to Animals Act.

THE King of Egypt has conferred the Order of the Nile (third class) upon the following in recognition of valuable services rendered: Dr. Harold Benjamin Day, professor at the School of Medicine, Cairo; Mrs. Cornelius B. S. Elgood, M.B., senior lady medical officer, Egyptian Ministry of Education; and Dr. Alexander A. W. P. Murison, medica officer, Egyptian State Railways.

THE King has approved the retention of the title of Honourable by Dr. Charles Ferdinand Marks and Dr. William Frederick Taylor, who have served continuously for a period of not less than ten years as members of the Legislative Council of the State of Queensland.

THE following members of the British Medical Association have been appointed Knights of Grace of the Order of St. John of Jerusalem: Major J. R. Williams, Penmaenmawr (late High Sheriff of Carnarvonshire), and Surgeon Lieut.-Colonel J. D. Lloyd, Chirk.

SPECIAL courses in diseases of the heart and gynaecology will be held at Franzenbad (Czecho-Slovakia) from the 21st to the 24th of September by Drs. A. Ghon, R. Jaksch, R. Schmidt, and G. A. Wagner of Prague, J. Halban, F. Hitschmann, J. Pal, and H. Thalimer of Vienna, H. E. Hering of Kiel, R. T. von Jaschke of Giessen, H. Kehrer of Dresden, O. Minkowski of Breslau, Seitz of Frankfort, Volhard of Halle, G. Winter of Königsberg, and K. Zörkendorfer of Prague.

AMONG the recipients of civil pensions is Dr. Francis Warner, who in consideration of his circumstances receives £100 in recognition of services rendered in his investigation into the mental and physical condition of defective children.

THE Scottish schools have been celebrating the close of the term by speech days. At the ceremony at Ballachulish Dr. Lachlan Grant not only gave an address, but supplied the prizes, which the education authority, for reasons of economy, had ceased to give. At the Morrison Academy, Crieff, the medal was presented to the dux by Dr. Gairdner, who, in an address, mentioned that he himself had received the medal in 1852, and that he had since been for fifty-five years medical officer for Crieff.

THE annual dinner of past and present students of University College Hospital will be held at the Hotel Cecil on Friday, October 6th, 7.30 for 8. The chair will be taken by Sir Dawson Williams, C.B.E., F.R.C.P., Editor of the BRITISH MEDICAL JOURNAL. The secretaries are Dr. A. M. H. Gray and Mr. Gwynne Williams, 30, New Cavendish Street, W.

THREE blind students (two civilians and one ex-soldier), trained at the Massage School of the National Institute for the Blind, have passed the recent massage and remedial gymnastics examinations of the Society of Massage and Medical Gymnastics. Another civilian student, for whom the National Institute paid fees and expenses at a Liverpool massage school, has also passed the massage examination. Two blind women masseuses have passed in remedial gymnastics.

DURING last June 481 deaths from plague occurred in Java; in June, 1921, the number of deaths from this cause was 520.

ROENTGENOLOGY has recently been made a compulsory subject for the medical curriculum in Rumania.

AT Wimbledon police court, on August 8th, James Allport, described as a pathologist, of Cheltenham, was charged with unlawfully and wilfully pretending to be a registered medical practitioner. A full report appears in the *Wimbledon Boro' News* for August 11th. Mr. G. D. Roberts, instructed by Messrs. Hempson, prosecuted on behalf of the Medical Defence Union; there was not, he said, anything to prevent a man practising medicine, whether he was registered or not, if he could find people to entrust themselves to his tender mercies, but the law said it was an offence to pretend to be a registered medical practitioner if you were not. The accused was engaged through an agency as a locumtenent by Dr. Sweetnam of Wimbledon Park, who believed him to be a registered practitioner, and he attended patients and signed medical certificates. The accused said that he told the agents that he was not qualified for general work, and also that he had tried to get bacteriological or *x*-ray work. During the war, he said, he had been an acting medical officer at an infirmary. After evidence had been given of certain other charges against him Allport was fined £20, with the alternative of three months' imprisonment, on the charge of pretending to be a registered medical practitioner, and sentenced to three months' imprisonment on other charges.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

"N. E." asks for information as to the present condition of Carisbad, and the cost of a course of treatment there.

"M.D." asks for information about the Portuguese Riviera as a winter resort for a patient subject to bronchitis. He desires information, among other points, on the cost of living and the sanitary and social conditions.

WARTS OF THE SCALP.

DR. JOHN S. CLARKE (Weobley) writes in reply to "X. Y. Z.": I can vouch for the efficacy of freezing by carbonic acid snow. I have recently had the treatment myself at the hands of a colleague. The effect is most gratifying. Rather deep freezing was employed. Practically no discomfort was occasioned. Very little hair had to be snipped away. After ten days the hair on the area treated was showing signs of growth.

ALUMINIUM COOKING VESSELS.

A CORRESPONDENT asks whether any danger can arise from the use of aluminium cooking utensils. He wishes to know whether acid or fruit juices may form poisonous salts or milk be contaminated.

*** Aluminium is the best metal next to gold or platinum for culinary utensils. It is better than silver, for silver is more quickly corroded by table salt than is aluminium by the acids of fruit. Moreover, the injury to be apprehended from the results of the corrosion suffered, even if the corrosion were considerable, is insignificant in the case of aluminium, since the product of corrosion would consist only of that which is a common constituent of almost every ordinary food as well as of drinking water.

INCOME TAX.

"R. S. V. P." is being pressed by the income tax inspector to employ an accountant to prepare statements of receipts and expenses and of assets and liabilities.

*** That course may be usual among traders holding substantial stocks and business assets of various kinds, but is not usual among medical practitioners. It is not clear why the inspector should ask for statements of assets, etc.; if the return has been correctly computed year by year on the basis of the total gross cash receipts, less specified expenses under the usual heads, it seems that the "assets" figures will serve no useful purpose.

"D. W." has been asked by the inspector of taxes to state the amount of his outstanding book debts for the adjustment of his cash basis return.

*** The authorities at Somerset House have officially acquiesced in the "cash basis" method of computation, subject to any particular cases in which that basis would for some special reason be an unfair index of the income accruing from the practice. We advise our correspondent to remind the inspector that the cash basis has official sanction and to ask why it should be refused in his case.

"O. H." is employed as an assistant and earns sundry fees in addition to his salary. Can he still claim the three year average?

*** If the fees are paid by the practitioner whom he assists the answer is, No; if otherwise he can average the fees but must accept assessment on the current year's basis as regards the salary.

"R. C. P." renewed his car in 1921 and was allowed the whole of the cost. He has since renewed it again, but the authorities claim to exclude one-third of the cost because to that extent the car is used for pleasure, though it was primarily bought for professional purposes.

*** The expense claimable is the amount necessitated by professional use. It would seem that the private use hastens the date when renewal becomes necessary, and that it is therefore right that some adjustment should be made in calculating the renewal allowance for tax purposes; whether one-third is a reasonable proportion we cannot, of course, say.

"FINANCE" "has set up in practice" for the first time and inquires as to allowances for (1) outlay on instruments, medicines, and books; (2) surgery, rent, and expenses; (3) hire of motor car in place of owning a car; (4) remuneration of locumtenent for holiday purposes.

*** (1) Not allowable—only expense of renewals can be claimed, the original stock represents capital outlay; (2) allowable in so far as actually incurred and within reason; (3) allowable; (4) allowable.

LETTERS, NOTES, ETC.

DIABETES IN THE TROPICS.

LIEUT.-COLONEL E. E. WATERS, I.M.S. (Calcutta), writes: In the kindly review of June 24th, 1922, on my book on diabetes, it is asked whether the book is on sale in England. Will you allow me to state that the publishers have arranged for its sale in London by Messrs. H. K. Lewis, and in Edinburgh by Messrs. Bryce?

MEASLES WITH MULTIPLE TUBERCULOUS MANIFESTATIONS.

DR. N. WALSH (Swindon, Wilts) writes: F. W., a girl, aged 8, when first seen, was suffering from coryza, slight cough, and pyrexia (100°); the pulse was rapid. The chest was carefully examined but only slight signs of catarrhal bronchitis were found. As there was at the time great prevalence of measles, it was thought that the patient might be suffering from that disease. She was put to bed and placed under expectant treatment. A few days later she vomited—mainly a green fluid—but not very violently, and on only one occasion. The temperature was 101° and the pulse 94. There were signs of conjunctivitis, photophobia was present, and pain was complained of in the region of "the back of the eyes." The slight cough disappeared, and although the chest was carefully watched, no signs of bronchitis or pneumonia were ever found. The following day the rash appeared. It was typical of measles, and was very abundant. It disappeared on the seventh day, but the temperature was still raised: it advanced to 104.5° and kept at that level for seven days. Then the cervical glands became enlarged and formed projections at both sides of the neck, about 4 in. by 3 in. Difficulty in deglutition and rapid emaciation ensued. The pulse became soft, rapid, and irregular, and in spite of stimulants the cardiac action showed signs of failing, which gradually became more and more evident. There was also extreme tenderness of all the limbs, the child moaning when they were merely touched.

Another feature was oedema of the right arm from shoulder to elbow. The abdomen, which had been normal, began to show signs of distension which rapidly increased; a little fluid was then made out. The surface veins were well marked, the stools became loose, and the whole condition of the abdomen became very suggestive of tuberculous peritonitis. The child now showed some retraction of the neck, dilated and unequal pupils, and a meningeal cry. Kernig's sign appeared; the temperature fell to 100.4°, and the patient died on the eighteenth day.

This case is interesting from the multiplicity of the lesions, and from their rapid appearance. It is remarkable that at no stage was there any serious chest trouble.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 25, 26, 28, 29, and 32 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 30 and 31.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *96*.

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